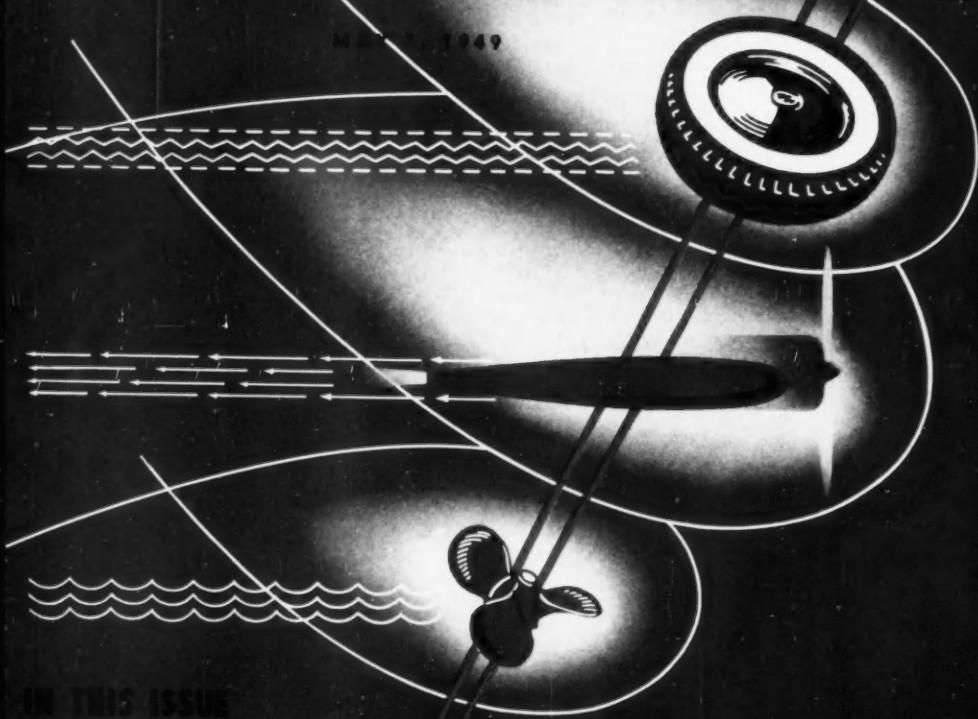


# AUTOMOTIVE INDUSTRIES



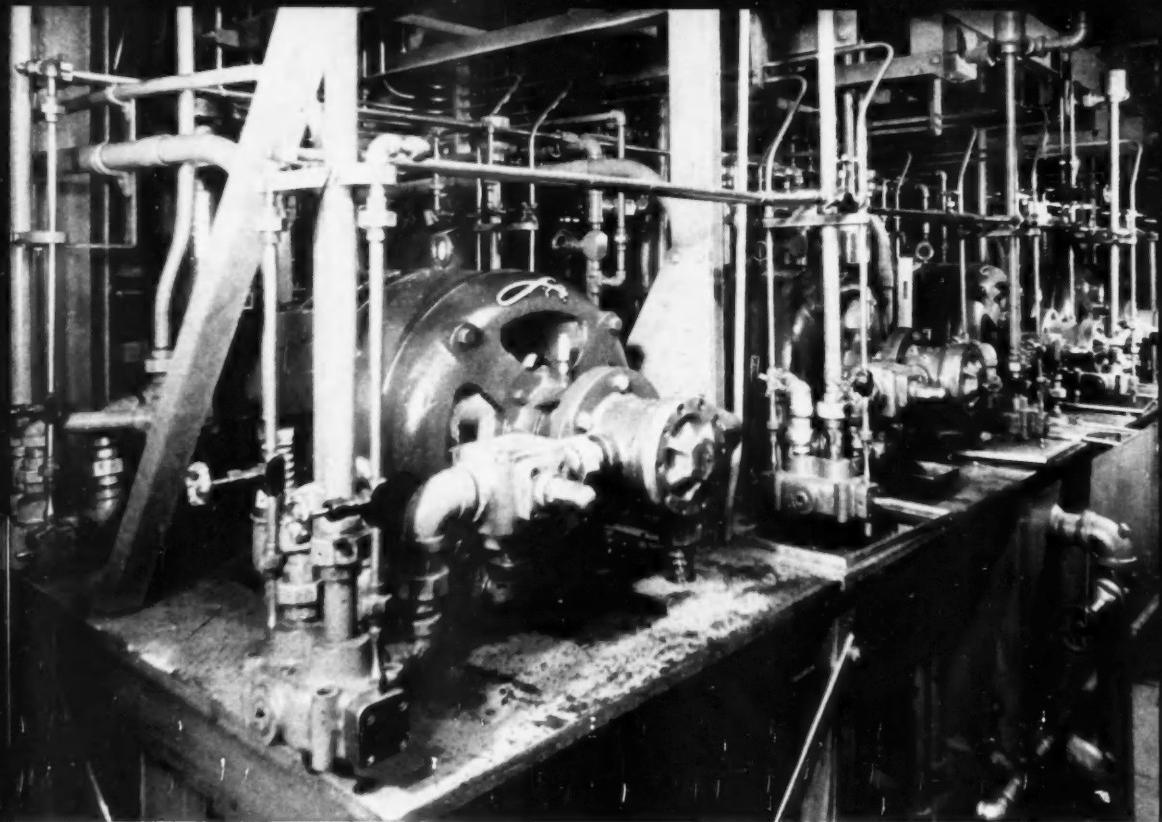
## IN THIS ISSUE

- Design Features of Postwar Automobiles
- A Preview of the 1949 Lincoln-Zephyr Speed Coupe
- White Delivery Truck with Powered Til' Cab
- Mocking Operations at Cadillac's H. C. Engle Fisher
- Bendix Introduces Hydraulic Powered Steering Gear

Complete Table of Contents, Page



MOTOR AGE PUBLICATIONS



## How to boost the efficiency of your hydraulics

### STANOIL Industrial Oil

A 3,000-gallon central hydraulic system, shown in part above, is used for the operation of 55 molding presses in a mid-west manufacturing plant. In 1942, Stanoil 18 was introduced into this large system.

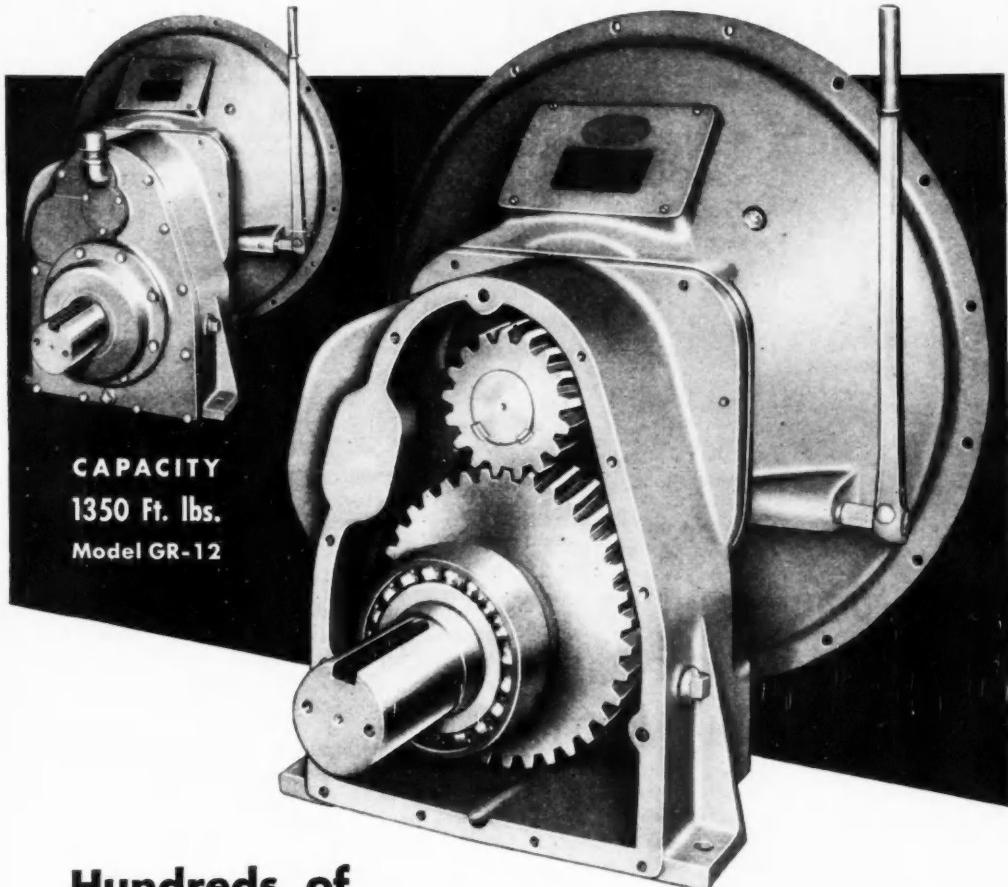
Tests of oil samples, made every six months, showed practically no deterioration of Stanoil. When the oil was changed, after more than 3 years' service, it showed a neutralization number of only 0.53. In the entire  $6\frac{1}{2}$  years of operation, make-up oil averaged no more than a barrel per month and there were no deposit or corrosion troubles.

These facts indicate the benefits you can gain by switching your hydraulics to Stanoil, but they by no means tell the full story. This unique, multi-purpose oil will provide clean, dependable lubrication in a wide variety of circulating systems. You can replace costly special oils and simplify stocking problems by using Stanoil throughout your plant. A Standard Oil Lubrication Engineer will be glad to help you.

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**HEAVY-DUTY**  
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points a way to...

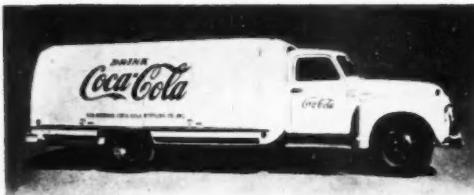


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These steels provide:

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# AUTOMOTIVE INDUSTRIES

Published Semi-Monthly

May 1, 1949

Vol. 100, No. 9

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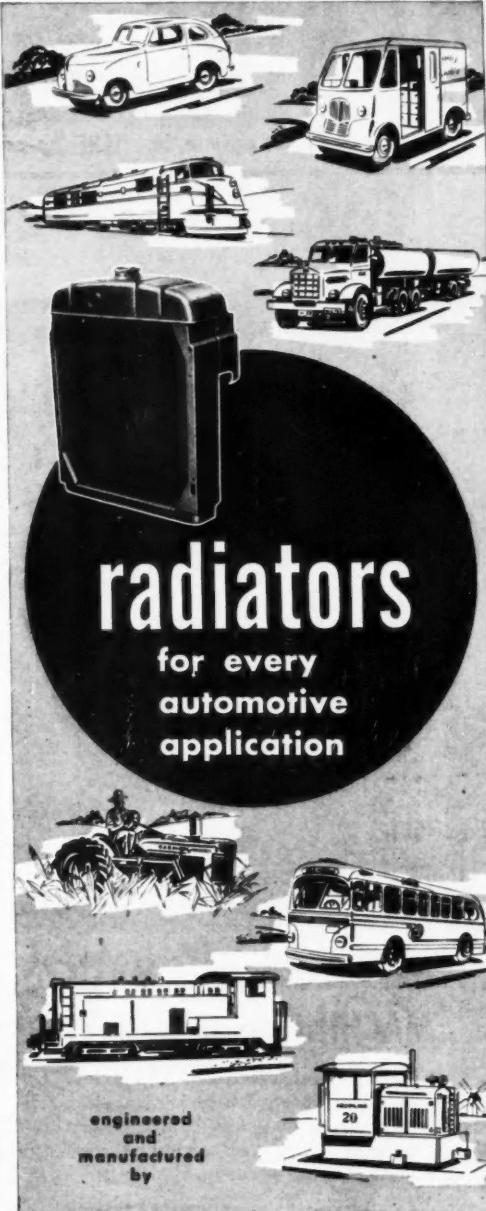
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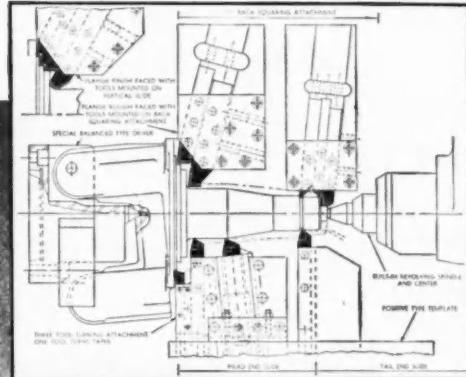
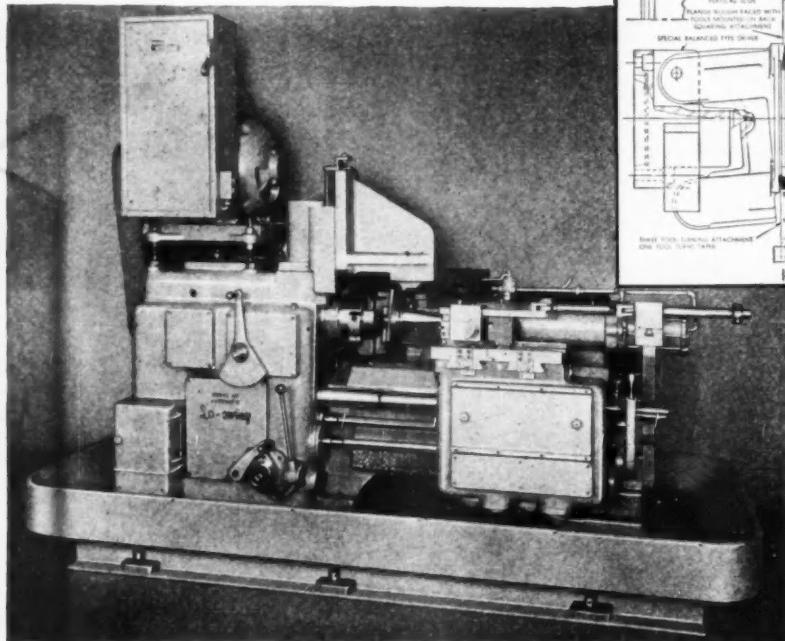
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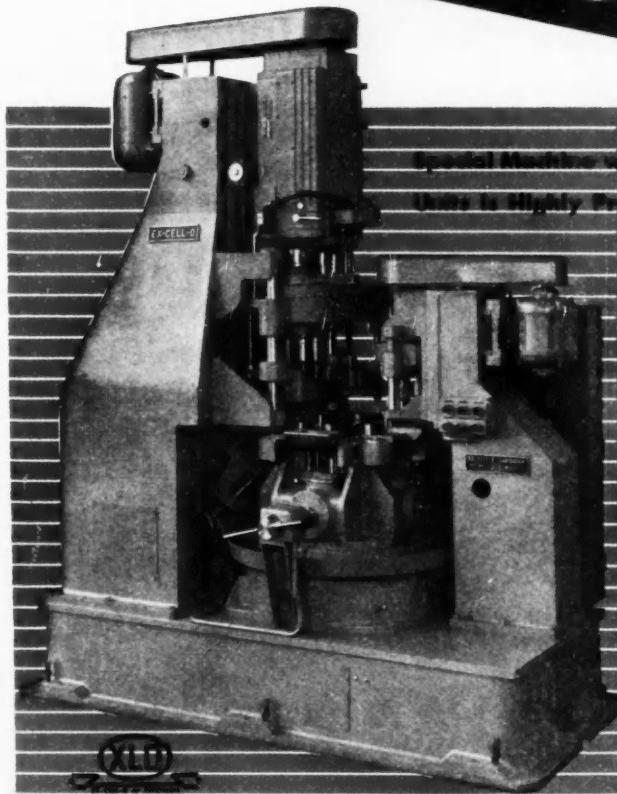
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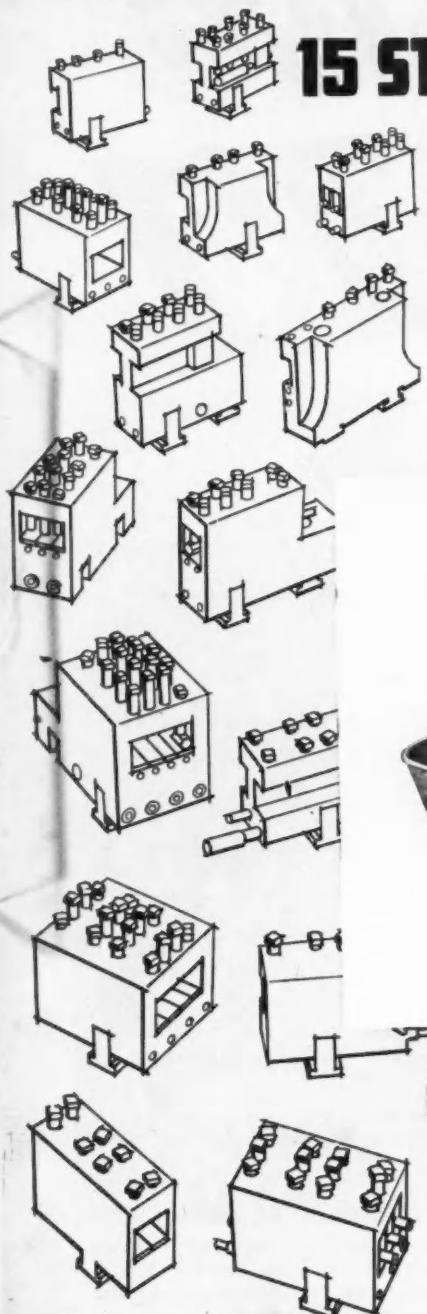
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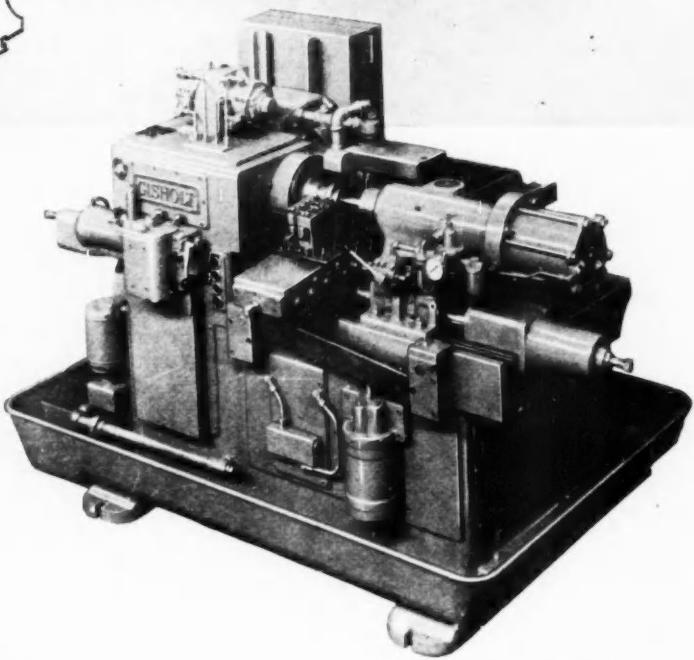
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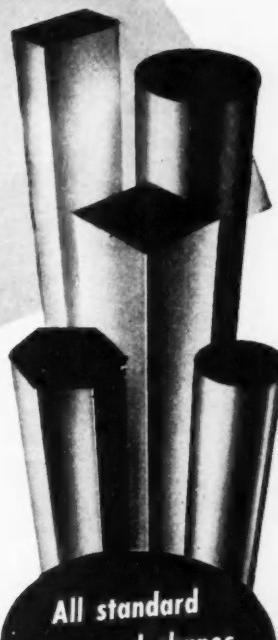
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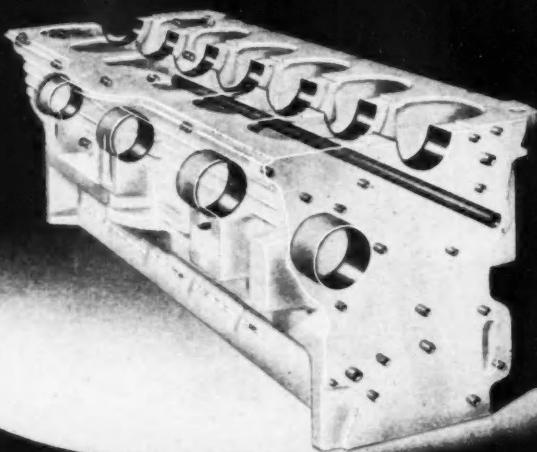
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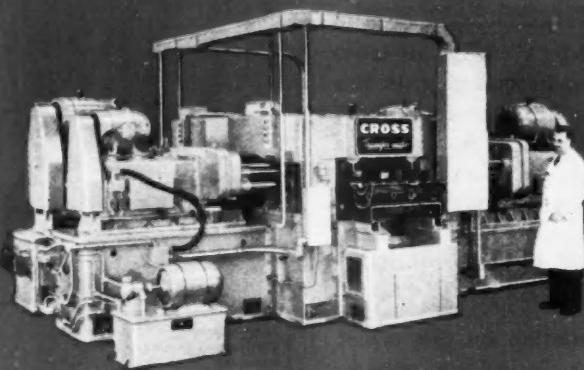
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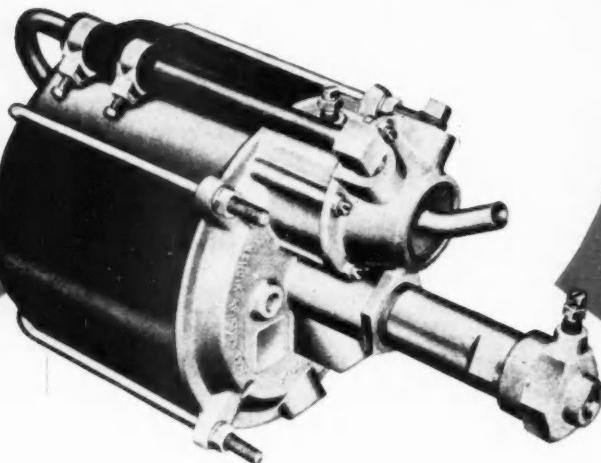
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# AUTOMOTIVE INDUSTRIES

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AUTOMOTIVE INDUSTRIES, May 1, 1949

The Authoritative Technical and News Magazine  
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and Foreign, of These Industries:

Passenger Car	Engine	Parts and Components
Truck	Body	Accessory
Bus	Trailer	Production Equipment
Aircraft	Road Machinery	Service Equipment
Tractor	Farm Machinery	Maintenance Equipment

## High Spots of This Issue

### 1949 Indianapolis Speed Classic

Thirty-three cars will run in this exciting 500 mile race this year. Seventy-five percent will be equipped with the Meyer & Drake Offenhauser engine. Seasoned opinions and points of fact expressed by a well-known racing car builder in this article make it a speedy "must" on your reading agenda. You'll find the "starting line" on page 24.

### Automatic Transmissions—Part II—Packard

Second of a series of articles initiated last issue on modern transmissions discusses major features of Packard's new automatic transmission. The mechanism combines a mechanical direct drive clutch with torque converter of the three element type. Detailed diagrams simplify understanding of this important device, its analysis beginning on page 29.

### Bendix Introduces Power Steering Gear

A self-contained hydraulic steering gear of worm-and-nut type, used in combination with a hydraulic power cylinder and control valve, is said to eliminate all need for fighting the wheel in an emergency. First announcement of this power steering gear, bearing the Bendix name, is published with ample pictures, on pages 34 and 35.

### Machining Slipper-Type Pistons for High Compression Engine

A slipper-type piston made of aluminum alloy has posed major machining problems at the Cadillac plant in the production of 1949 V-8 engines. How Cadillac has overcome these problems by unconventional methods of chucking at the open end is divulged among other details in the account on page 40.

### Determining Stresses in 110-Ton Gooseneck Trailer

Some 20 Baldwin SR-4 strain gages were used in determining stresses in the gooseneck region of the world's largest highway transportation unit, built by the Fruehauf Trailer Co. Test procedures and results are illustrated, charted, discussed and summarized in the story on page 42.

### 22 New Product Items

#### And Other High Spots, Such As:

Packard's Golden Anniversary models: remodeled facilities for developing heaters and defrosters at Eaton Mfg. Co.'s engineering laboratory; White's new truck with powered tilt-cab; a unique fuel injection system not using a timing device; how American trucks are speeding European recovery; and high production turning of rough forgings at Timken-Detroit Axle Co.

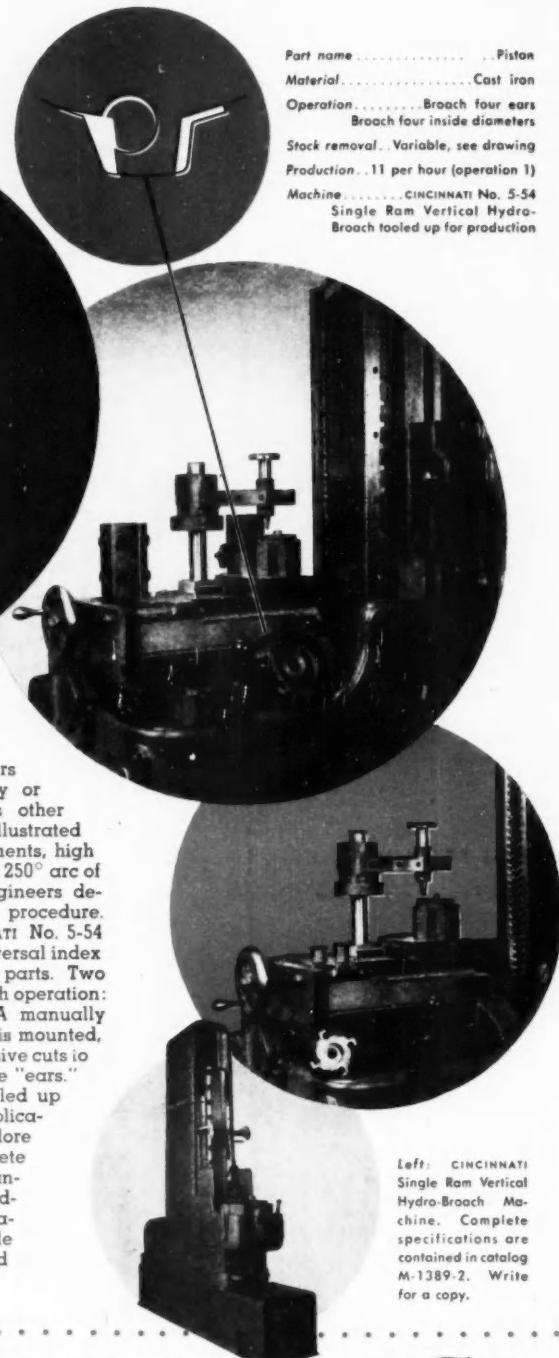
**News of the Automotive Industries, Page 17**  
**For Complete Table of Contents, See Page 3**

Drawing of one of the piston "ears" broached on the CINCINNATI equipment illustrated here. Broached surfaces and approximate stock removal are indicated in white.

This Hydro-Broach  
removes a  
lot of stock...  
AND INTERNALLY  
BROACHES A  
250° SEGMENT

Minor factors such as floor space, cutter life, accuracy, operator fatigue and others sometimes sway the decision one way or another in selecting broaching versus other methods. An example of this type is illustrated here. In spite of low production requirements, high stock removal, and an accurately finished 250° arc of a long hole, Cincinnati Application Engineers devised a highly successful broaching procedure. They assigned the job to a CINCINNATI No. 5-54 Single Ram Vertical Hydro-Broach. A universal index fixture accommodates several sizes of parts. Two broach holders were supplied, one for each operation: 1) broach ears; 2) finish broach ID. A manually operated sub-plate, on which the fixture is mounted, provides a method of taking three progressive cuts to remove all of the stock on the sides of the "ears." Many borderline parts have been tooled up for low cost broaching by Cincinnati Application Engineers. They will help you explore the possibilities. Blueprints with complete details will give them a head start. Meanwhile, why not learn more about the advantages of CINCINNATI Hydro-Broach Machines by writing for literature? Single Ram Machines, catalog M-1389-2, and Duplex Machines, catalog M-1387-2.

Part name ..... Piston  
Material ..... Cast iron  
Operation ..... Broach four ears  
Broach four inside diameters  
Stock removal ..... Variable, see drawing  
Production ..... 11 per hour (operation 1)  
Machine ..... CINCINNATI No. 5-54  
Single Ram Vertical Hydro-Broach  
Broach tooled up for production



Left: CINCINNATI  
Single Ram Vertical  
Hydro-Broach Ma-  
chine. Complete  
specifications are  
contained in catalog  
M-1389-2. Write  
for a copy.

THE CINCINNATI MILLING MACHINE CO.

CINCINNATI 9, OHIO, U.S.A.

MILLING MACHINES • BROACHING MACHINES • CUTTER SHARPENING MACHINES  
FLAME HARDENING MACHINES • OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID



# NEWS of the AUTOMOTIVE INDUSTRIES

Vol. 100, No. 9

May 1, 1949

## Julian Chase Retires—James R. Custer

### New Editor Automotive Industries



JULIAN CHASE

Climaxing 50 years association with the automobile industry and publishing business on April 30, 1949, Julian Chase, dean of automotive editors, retired as a vice president and director of the Chilton Co., Directing Editor of its Automotive Division and Editor of AUTOMOTIVE INDUSTRIES, to live at his country home in Woodbury, Conn.

James R. Custer, former Associate Editor, has been named Editor of AUTOMOTIVE INDUSTRIES. An Editorial Executive Committee composed of the editors of the magazines, AUTOMOTIVE INDUSTRIES, Commercial Car Journal, and Motor Age will take over duties hitherto performed by the Directing Editor.

Julian Chase was graduated from Brown University in 1899, and entered the automobile business with the United States Automobile Co., later becoming automotive sales manager of the Ward

Leonard Co. Engaged in developing, designing, building, racing, and selling automobiles, Mr. Chase, then writing many articles for various automotive publications, became editor of *The Horseless Age* in 1904. In 1905, he was appointed editor of *Motor*, and *Motor Boating*, and in 1915 became a partner and editor of *The Horseless Age*, which was later merged with the Class Journal Co., a division of the United Publishers Corp., which eventually became the Chilton Co. In World War I, Mr. Chase was on the War Dept.'s General Staff organizing training centers for transport drivers. Following the war, in 1923 he became directing editor of the Chilton Class Journal, in 1927 business manager of AUTOMOTIVE INDUSTRIES, and in 1933, directing editor of the Automotive Div., Chilton Co. Having been a member of the board of predecessor companies for many years, Mr. Chase was elected a director of the Chilton Co. in 1934, and was named a vice president in August, 1945.

Mr. Chase is a past president of the National Conference of Business Paper Editors; member of the Society of Automotive Engineers (1908); member of the board of directors of the Automobile Old Timers, from whom he received a citation for contributions to the development of the automobile; member of the Antique Automobile Club; the National Aeronautics Association; and the Brown Engineering Association. He was special department editor of Funk & Wagnall's new standard dictionary in 1913.

Associated with AUTOMOTIVE INDUSTRIES since 1941, James R. Custer was graduated in 1932 from the Engineering College of the University of Detroit and the next four years was engaged in aircraft



JAMES R. CUSTER

engine research work with Continental Motors Corp. Joining the Central Engineering Department of the Chevrolet Motor Div., General Motors Corp. in 1936, Mr. Custer was assistant in charge of the Technical Data Section, preparing Chevrolet engineering publications and acting as liaison between the engineering, advertising, sales and service departments. Before entering the engineering field, Mr. Custer was engaged in newspaper work for a number of years, specializing in business and financial reporting.

He received his training in journalism at the University of Pennsylvania. Mr. Custer is a member of the Society of Automotive Engineers, American Ordnance Association, and the National Conference of Business Paper Editors. In 1941 Mr. Custer joined AUTOMOTIVE INDUSTRIES as Assistant Editor, and in 1942 was named Associate Editor.

# NEWS of the AUTOMOTIVE INDUSTRIES



ONE OF ITS KIND

The Studebaker Corp. has designed and built at its own expense one sample of this new 2½ ton, six-wheel drive military truck for Army Ordnance inspection. The grille guard, radiator, engine, clutch and transmission can be removed without removing any sheet metal parts. The steering gear, clutch, brake pedals, and master cylinder are located on the outside of the frame for easy accessibility.

## Packard and Hudson Observe Anniversaries This Year

This year is being observed as an anniversary year by two of the oldest manufacturers in the automobile industry: Packard and Hudson. Packard is commemorating its 50th year in the business and will call its 1950 cars, just introduced, its Golden Anniversary models. Hudson has already observed its 40th anniversary with a coast-to-coast radio program and a press luncheon in Detroit. Both companies are going forward with considerable expressed optimism in the future. During the first quarter of this year, Hudson set the highest mark in 20 years for first quarter production and sales. So far this year, Hudson's share of the total automobile business is double what it was prewar.

## Ford of Mexico Planning \$2 Million Expansion

In order to modernize working conditions and permit a 50 per cent increase in the output of Ford cars and trucks in Mexico, the Ford Motor Co., S. A., Mexico City, is planning a \$2 million building and expansion program. This was announced by Fraine B. Rhuberry, general manager of the local subsidiary of the Ford Motor Co., who stated that preliminary work would begin at once on the two-year project which is expected to increase usable floor space from the present 240,000 sq ft to a total of 451,000 sq ft. When expansion is completed, the plant will be able to produce 18,000 cars and trucks a year on one shift. Production of even more than

the 18,000 units contemplated would be possible with minimum additional expansion if quota and other conditions in 1951 and thereafter are favorable.

## Automatic Transmissions Rife in Automobile Industry

Automatic transmissions continue as the hottest item in the automobile industry. Packard is currently out with its new torque converter on the highest

priced of its 1950 models just announced, and it is expected that installation of the Hydra-Matic on the Lincoln will be started late this month with introduction to the public in June. Nash will have an automatic drive on its 1950 models, but it will probably not be announced until very late this year. The unit will be confined to the Ambassador line. It is to be built by Borg-Warner, which is also working with Studebaker, Kaiser-Frazer, and Ford and possibly with Hudson. Chevrolet has a torque converter unit under development, and it is thought that it will be available next year.

## Automobile Sales Show Normal Spring Gain

The new car market has fallen into the traditional pattern of a sharp upsurge in sales during the spring months. Business was admittedly in something of a slump during the winter months, but in recent weeks has taken a sharp upturn. Production is booming along at a record postwar rate. March production set a postwar record, and it looks now as if April will go even higher, possibly to 525,000 units or about 5000 higher than in March. It also seems likely that if no major interruption occurs, the industry in the second quarter may approach the alltime record of 1,506,494 cars and trucks for any three months period, which was reached in the second quarter of 1929.



ONE OF SIX

Accentuating a wider, deeper, and more comfortable all-steel cab, this new Peterbilt truck is one of six new models available in wheelbase lengths from 175 to 240 in., recently announced by Peterbilt Motors Co., Oakland, Calif. The new models stress accessibility for both maintenance and repairs, and can be equipped with Diesel, butane, or gasoline engines.

# NEWS of the AUTOMOTIVE INDUSTRIES

Actually, sales have been excellent so far this year with most companies reporting record or near record performance in March. Nash sales for the month were the highest in 20 years and were up 40.1 per cent from February. During the last ten days of March, retail deliveries showed an increase of 83.6 per cent above the last ten days of the preceding month. For the same period, Hudson sales were up 40 per cent above the average for the first two 10-day periods of the month. Retail deliveries during March were the highest since 1929. Studebaker during March set an alltime record for the number of retail deliveries of cars and trucks, and is currently adding 700 employees as the first step in increasing passenger car production from about 4620 weekly to 5020 units. Packard also set a new postwar delivery record with 11,594 units. GM and Ford increased their March sales as did Chrysler which has just introduced its new models. The largest percentage increase reported by any company is by Kaiser-Frazer, but its sales gain started a little later following price cuts late in March. K-F reports that during the first 12 days in April, retail sales had increased 89 per cent above the same period in March.

## Hudson and Austin Cut Prices

The Hudson Motor Car Co. has joined the parade of price cuts by reducing its prices \$15 to \$100 on its passenger cars. The reductions range from less than 1 per cent to about 3.4 per cent. The Austin Motor Co., Ltd., has cut the price of its cars in the U. S. by \$75 to \$200. The New York delivery price now ranges from \$1520 for a two-door sedan to \$1870 for the station wagon. The Austin Motor Car Co. of Canada has also cut its prices from \$100 to \$200. General Motors and Ford, who have cut car prices in this country, early in April increased prices of cars sold in Australia by \$48 to \$240. The increases apply to most of the automobile and truck models sold by these two companies in Australia.

## Plymouth & Dodge Building Short Wheelbase Models

Plymouth Div. of Chrysler Corp. is in production of its 111-in. wheelbase, three-passenger coupe. The two-door sedan and the all-steel station wagon will go into production in a few weeks. The only price announced is for the three-passenger coupe which bears a factory retail price of \$1295. Dodge is currently in production of its Wayfarer

line on a 115-in. wheelbase. It includes a roadster, three-passenger coupe, and two-door sedan. The price of the three-passenger coupe is \$1525. The prices of the other two models have not yet been announced.

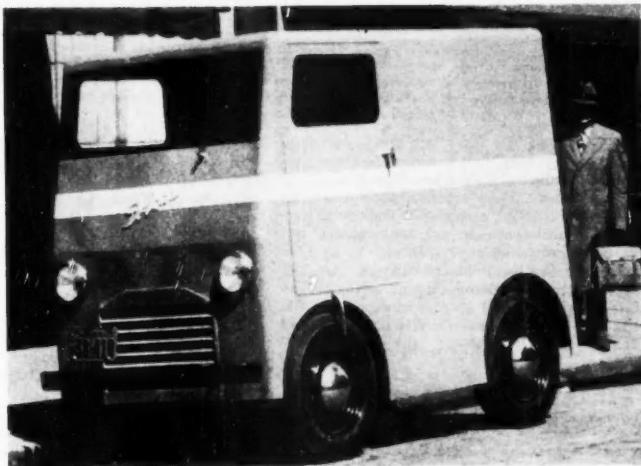
## Vehicle with Oval Wheels for Muddy Ground

A new vehicle with "walking wheels" that are oval shaped, but which in action rotate as smoothly as round wheels has been introduced by a North Tona-

demonstrated recently at the rear of the company's plant, and the pint-sized model plowed with ease through mud to its axle.

## Use Platinum in New Process for High Octane Fuel

Termed "Platforming" a new oil refining process employing platinum as a catalyst has been announced by the Universal Oil Products Co. of Chicago. The process is said to produce a high-octane motor fuel from low-grade,



## SUPPORTED INDEPENDENTLY

Built by American Motors, Inc., Troy, N. Y., the Delcar features independent rubber tension cord suspension for all four wheels. Weighing 1600 lb., the Delcar has a 62 in. wheelbase, and is powered by a 25-hp Hercules engine. Production models are now being made, and it is expected that 500 units will be built this year.

wanda, N. Y., company. It is claimed that the device can be adapted to such vehicles as military tanks, Jeeps, half-trucks, farm implements and earth-moving equipment. "The oval-shaped wheels actually seem to walk rather than roll as they turn," said President John F. Kopczynski of the Pivot Punch & Die Corp. He had been working on his invention for 10 years.

The device has dual wheels, one forward of the other, on a rubber arm. The wheels are synchronized to move so that as the flat part of the oval of one wheel is parallel to the ground, the oval shape of the other is at its peak. This gives an overall effect of roundness and smoothness in motion, but retains the "digging in" action of the egg-shaped wheels. A scale model with wheels about 16 in. high, at their highest point, was

straight-run gasoline at a lower cost than has heretofore been possible. The process was invented by Dr. Vladimir Haensel, a chemist for Universal Oil Products.

## Report Sears-Roebuck Seeks Car Franchise

The recurring rumor that Sears-Roebuck & Co. is negotiating with one or more of the independents for sale of one or more of its models is again abroad. The report is not without some foundation since it has been confirmed that Sears tried to negotiate with Kaiser-Frazer not too long ago to handle the sale of the Traveler utility model. Service would be handled by established K-F dealers. K-F, however, turned down the proposition since it already has a

# NEWS of the AUTOMOTIVE INDUSTRIES



## MAIL EXPEDITER

Powered by a 200-hp gasoline engine, 15 models of this Mack C-45 highway post office bus are being put into operation by the Treasury Dept.'s Bureau of Federal Supply to expedite the delivery of mail from urban centers to smaller communities. Postal clerks receive, sort, bundle and pouch the mail en route in this bus which is of the same design as Mack's regular 45-passenger transit bus.

going dealer organization to handle all its sales. It is reported now that Sears is trying to make a deal with Willys, but there is no confirmation from either company. Observers familiar with the industry take a dim view of the merchandising of automobiles by department stores, pointing out that they do not have service facilities available.

## Chrysler Stockholders Approve Boost in Common Stock

The stockholders of the Chrysler Corp. have voted to approve a directors' proposal to boost authorized common stock from 15 million to 20 million shares, and to increase the par value of the stock from \$2.50 to \$25 a share.

## Navy Working to Develop Air and Water Fuel

The Navy is working on a project to develop hydrozine, a motor fuel made of air and water. Its molecule is almost the simplest possible combination of the two basic elements, hydrogen and nitrogen.

## Int'l Harvester Opens New Australian Plant

The International Harvester Co. of Australia, Ltd., has opened what is described as Australia's newest and most modern automotive plant in Geelong, Victoria. Three models of International trucks, and two models of McCormick International farm wheel tractors will be produced in the new plant.

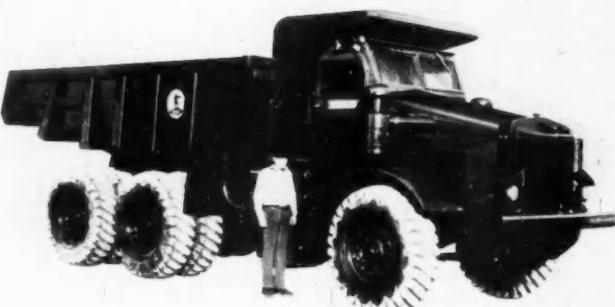
ly will run through the most of next year with it. At the time of the Ford announcement it was stated that the current style would prevail for at least two years which would indicate that the next style change should come sometime in 1950. The same will be true for Lincoln and Mercury. Kaiser-Frazer and Studebaker both have had their current styling since early 1946. K-F is expected to run through all this year without a major styling revision. Studebaker will probably do likewise. Changes at Nash and Hudson also are not contemplated for at least another year.

## Canada Increases Vehicle Import Quotas 25%

The Dept. of Trade and Commerce of the Canadian government has increased the allowable number of motor vehicle imports from the United States by 25 per cent. The ruling applies also to trucks under 16,501 lb GVW, and to manufacturers not having plants in Canada. Special permits for heavier vehicles are available if need is demonstrated.

## Names Graves Vice President of Packard Engineering

William H. Graves, formerly Packard executive engineer, has been appointed to a new post of vice president and director of engineering by the Packard Motor Car Co. board of directors. The



## SIDE BY SIDE

Successfully completing field tests on the Minnesota Iron Range, this new model FFD-rear-dump Euclid will be shown for the first time at the Coal Show in Cleveland, May 9-12, by the Euclid Road Machinery Co. Powered by two Diesel engines, 190-hp each, mounted side by side, the truck's top speed is about 25 mph with a full 68,000 lb payload.

# NEWS of the AUTOMOTIVE INDUSTRIES

action was taken at the annual meeting at which all seven directors were reelected by unanimous vote. Of the 15 million common shares of Packard stock outstanding, 80 per cent were represented at the meeting in person or by proxy—an alltime high. All officers of the company were reappointed or reelected to their previous positions.

## Willys Adds Improvements to Current Models

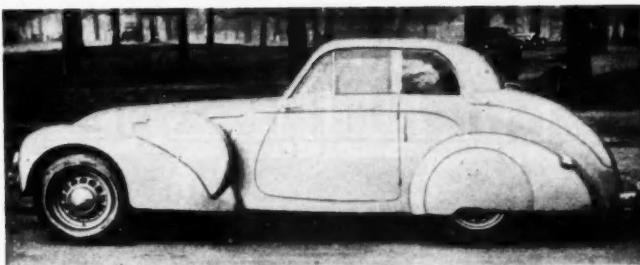
In line with its policy of not making annual model changes, Willys-Overland has announced that several design improvements are being incorporated into its current line of vehicles. Improvements are being made on the Jeep to provide better performance, greater riding comfort and broader versatility. These include station wagon seats with zig-zag springs and rearrangement of the seating for more leg room and more comfortable seating posture. A rigid windshield is provided with rectangular, rather than round tubing frame, to make a better seal at the top and door hinges when used with weatherproof enclosures. A ventilator has also been installed below the windshield. A channel type frame of heavier sections is used for a greater chassis strength, and ground clearance below the steering linkage has been increased. A foot operated starting control has been added to provide positive engagement of the starting motor gear with the flywheel for cold weather starting. Changes in the station wagon include improved slide window lock and weather seal, larger rear window glass area, and new tailgate lock. On the Jeepster, more conservative use of chrome ornamentation is used to reduce glare and a new single horn, standard low pressure tires, and improved door lock are provided. A combination fuel and vacuum pump used on the new Jeep also is becoming standard on all Willys vehicles.

## Briggs Sales Last Year Highest in History

The Briggs Manufacturing Co. earned a net profit of \$10,516,623 last year, compared with \$7,512,156 in 1947. Sales of nearly \$266 million last year were the largest in the history of the company.

## Chevrolet Revives Service on Used Cars to Dealers

GM's Chevrolet Motor Div. is actively preparing for more rugged competitive selling. A major step is the appointment of Warren R. Peel as man-



British Combination

## OPENS AND CLOSES

*Invented by Col. John Dolphin this all-metal convertible automobile, said to be the first built in England, can be converted from a closed sedan to an open touring model in one minute. As an open tourer, the steel roof lies out of sight in the hinged trunk. The car used is an Allard.*

ager of the national used car department. The used car operation has been in a state of suspended animation since before the war, and Chevrolet is now reviving it in order to be in a position to aid dealers in used car merchandising when disposal of trade-ins again becomes a problem. Like all other manufacturers, Chevrolet is urgently suggesting to dealers that they retail their own used cars rather than wholesales them to used car dealers. Mr. Peel was formerly assistant regional manager at Kansas City for Chevrolet, and has been with the division since 1928.

## Pneumatic Automobile Spring for Bumpy Roads

An American firm is said to be negotiating with Sven Swallert, a Swedish engineer, to manufacture a pneumatic automobile spring, adjustable for bumpy or smooth roads, which he has invented. The device reportedly consists of air pumps attached to each wheel, connected to a tank under the driver's seat, with a control on the instrument panel which enables the driver to regulate the air pressure in the pneumatic springs.

## Trustees Say Tucker Corp. Lacks Production Funds

The prospects for any production of Tucker automobiles grow dimmer by the week. The trustees of the corporation recently reported to the Federal court that it is impossible to attempt manufacture of the car at this time. The trustees said that even prior to their appointment by the court to direct the company's affairs, Tucker

Corp. did not have the necessary assembly lines and facilities required for automobile production, and that funds to make such facilities possible are not available. The court has also signed an order at the request of the trustees to sell about \$75,000 worth of material on hand because of large storage costs.

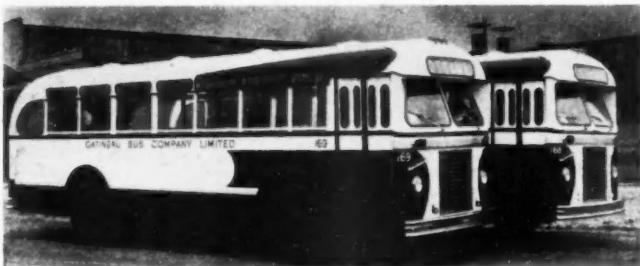
## All Future Jets to Use One Type of Fuel

All future production jet aircraft will be designed to use a new fuel known as AN-F-58 (Army-Navy fuel No. 58), a gasoline-type fuel with an octane rating varying between 50 and 65, and a campaign has been started to modify existing jets for its use. Changes necessary for the use of the new fuel involve modification of fuel pumps and relocation of various items of electrical equipment. More AN-F-58 than conventional jet fuel can be extracted from each barrel of crude oil. This higher percentage of usable jet fuel is a result of changing the distilling process and blending the distilled products. Use of the new fuel will not materially change the performance of individual aircraft, although performance at high altitudes will be improved slightly and cold-weather starting will be somewhat easier. Reciprocating engines in aircraft cannot use the new fuel although jets, after they are equipped for AN-F-58, can use the standard high-octane gasoline in an emergency.

## Ford Spurs Workers Ideas With Use of Film Strip

The Ford Motor Co. has instituted a new technique to stimulate suggestions from employes for improving manu-

# NEWS of the AUTOMOTIVE INDUSTRIES



**FINER CITYLINER**

The new 1949 Fitzjohn Cityliner has a restyled front end, wider and stronger bumpers, inward folding front and rear doors, and recessed headlights. Powered by a 131-hp Hercules engine, this bus has a wheelbase of 165 $\frac{1}{4}$  in.

factoring methods. Since the company began using a 35-mm sound-script film on press shop methods, the number of improvement suggestions has more than tripled. Employees are shown the film, which utilizes both cartoon sketches and photographs, and then asked whether anything more can be done to improve the operation. In the three months preceding the start of the film program, 55 suggestions were received from press shop employees. In the 90 days following the program, the number of suggestions jumped to 189, or an increase of 244 per cent.

## GM Cuts Diesel-Electric Locomotive Prices 5%

GM's Electro-Motive Div. has announced a five per cent reduction in the price of Diesel electric locomotives. It is the first general price reduction in that industry since 1939. The move was made despite a backlog of unfilled orders which is the highest in the plant's history. The price reductions range from \$5000 to \$8000 a unit.

## Federal Truck Planning New Large Model

The Federal Motor Truck Co. will soon announce a new 26,000 lb GVW Diesel model. The truck will be powered with a Hercules 426-cu in. engine. The truck has been under test for several months.

## Mooney Resigns as President of Willys-Overland

James D. Mooney, president and board chairman of Willys-Overland Motors, Inc., has announced that he has submitted his resignation as president.

Planning to remain as board chairman, Mr. Mooney stated that he would dis-

million share public offering. The offering was intended to raise about \$3.5 million.

## Make First Production Models of Kurtis-Kraft Sport Cars

The first production models of Kurtis-Kraft, Inc., sports cars are now being made, and 25 will be completed by August 1. Preliminary road tests show acceleration from 10 to 60 mph in 12.05 seconds, and a top speed of 100 mph has been attained.

## Steel Shortage Fades; See Lower Prices

Evidence continues to accumulate that the steel shortage is nearly over. Some companies are reported to be already absorbing freight charges to meet competitors' prices. Conversion deals are also rapidly disappearing al-



**JUST FOR JUNIOR**

Carrying 15 pupils, this new Chevrolet Junior school bus is designed to meet the needs of schools transporting small groups. Several manufacturers are now making the new school bus body which has an outside width of about 80 in. and which is mounted on a 137-in. wheelbase Chevrolet chassis with single rear wheels.

charge the duties of president until his successor has been appointed.

## Playboy Withdraws Stock Offering

The Playboy Motor Car Corp.'s second attempt to raise funds to finance the production of a small automobile through a public stock offering is being called off. The company has asked the Securities & Exchange Commission in Washington for permission to withdraw its stock registration for a two

though some manufacturers still have long term commitments which have several months to run. An interesting note is that when Kaiser-Frazer reduced production it encountered a little difficulty in disposing of some of its surplus steel. The prospect for lower steel costs is also good. The elimination of conversion steel will be a big factor. There is some expectation also that basic steel prices may decline later in the year, particularly in view of the bad break in the price of scrap, an important element in the cost of steel pro-

# NEWS of the AUTOMOTIVE INDUSTRIES

duction. Scrap has dropped to nearly half the price it was at the high point when it reached \$43 a ton. One possibility that might delay lower prices would be a revival in the general economy which could stimulate the demand for steel for competing products other than automobiles. For all practical purposes, however, it is still thought that the steel supply will be in balance with demand by the third quarter of this year at the very latest.

## **Big Three Contract With Japanese Car Firms**

Following the sanctioning of free trade in Japan last year, GM has concluded a trade agreement with the Yanase Automobile Co.; Ford with the New Empire Automobile Co.; and Chrysler with the Anzen Automobile Co., for the exportation of American automobiles to Japan.

## **Patel Builds First Indian Tractor**

Reportedly the first tractor ever built in India, a 30-hp Diesel-powered tractor was recently produced by Pashabai Patel & Co., Ltd., Bombay.

## **Curtiss-Wright Making Rocket Engines for Supersonic X-2**

Curtiss-Wright Corp.'s Propeller Div. has disclosed that it is in the final stages of developing the rocket power plant for the U. S. Air Force's new X-2 supersonic plane. Successor in series to the X-1, the first plane to exceed the speed of sound, the X-2 will be used as a flying research and development laboratory.

## **Name Harris Head of American Vehicle Administrators**

L. S. Harris has been elected executive director of the American Association of Motor Vehicle Administrators effective May 1. He succeeds A. W. Bohlen.

## **American Brake Shoe Buys WAA Plant in Buffalo**

The American Brake Shoe Co. is buying a former war plant in Buffalo from the War Assets Administration for \$610,000. The plant will be part of American Brake Shoe's Ramapo Ajax Div., which has a plant at Niagara Falls, and the Niagara Falls operations will be moved to the Buffalo plant.

## **Continental to Supply Engine for New Car**

Continental Motors has confirmed that it will supply a 64-hp engine to Del Mar Motors, Inc., San Diego, Calif., for use in a new automobile. Del Mar says that it will start production this month of a two-door five-passenger sedan to be built of standard components. The company says that it will establish assembly plants in Chicago, Philadelphia, and Fort Worth. The price is said to be approximately \$1200 at the plant.

## **International Harvester Working on New Engine**

We have a report that International Harvester is working on a new V-8 truck engine. It is not known whether it will be ready for use in new models, which will be announced later this year, but from what suppliers tell us about advance commitments, it is not considered likely. The engine is thought to be an overhead valve job in line with the trend in the industry, but as yet there has been no official confirmation.

## **Nash Moves from El Segundo to Los Angeles**

Nash Motors has announced that it has moved its zone offices and parts

warehouse facilities from its El Segundo, Calif., factory into new quarters in Los Angeles. The new zone headquarters provide 20,000 sq ft for parts and accessory warehousing, and an additional 5000 sq ft for office space and conference rooms.

## **Army Sounds Out Industry on Building Large Trucks**

Army Ordnance met with truck manufacturers in Detroit recently to find out which companies could build about 700 five-ton 6 x 6 military trucks a month. Actually, the funds are not available for anything like that production figure, but Ordnance would like to have a manufacturer tool up for limited production so that output could be stepped up to 700 units a month in case of an emergency. It is estimated that funds available for the rest of this fiscal year would permit the purchase of only 300 to 600 units, and the same number could be procured under the 1950 budget.

## **New Chrysler Building in Windsor, Canada**

The Chrysler Corp. of Canada, Ltd., has announced the occupancy of its new administration building in Windsor, (Turn to page 58, please)



**BUS FOR BRITONS**

British Combine

*This experimental double-deck British Green Line coach recently completed by London Transport has a streamlined front end, pneumatic push-button doors, airliner seats, fluorescent lighting, and an automatic air change system.*



Front end sheet metal of the Fageol Twin Coach Special covers the steering rods, front suspension, brake fittings, etc. (Evans photo).

By Frank Kurtis  
President, Kurtis-Kraft, Inc.

## A Racing the 1949

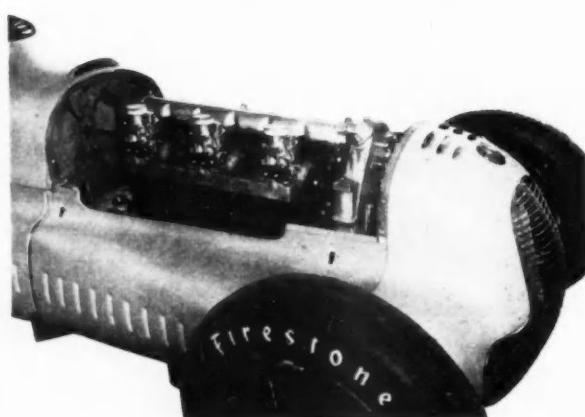
**I**N analyzing the 1949 Indianapolis 500 mile race, several interesting features stand out to attract the racing man's eye. New cars entered, modifications to cars that have run the race before, changes of drivers, and drivers that will be there for the first time—all point to an exciting Indianapolis race.

Reviewing engines for the race, it is significant that very few major changes have been made in engine design. The Meyer & Drake Offenhauser has been an old standby. Of the 33 cars that will run the race this year, about 75 per cent will be equipped with the Meyer & Drake engine. The balance will be engines

originally designed by Bud Winfield, Ed Winfield and Art Sparks, plus a few foreign engines. Although chassis development has progressed over the years, engine improvements have been retarded primarily because of the high cost of development work. The racing fraternity would like to see—and would encourage—further development in engines. In my opinion, the trend is definitely toward smaller engines.

There is a possibility that the smaller Meyer & Drake Offenhauser can be supercharged for use in the formula type race. With the advent of these smaller engines, it is logical that chassis design will be changed.

Another interesting thing to watch this year will be the attempt by several entries to run the entire 500 miles without a refueling stop. There has been much talk about this in the past, but in my experience it has been accomplished only once. Most of the cars qualify on alcohol and run the race on a blend of gasoline.



Side view of the Twin Coach special. Its six-cyl engine is the same as those used in Twin Coach buses with alterations to adapt it to racing. (Evans photo.)

# Builder Previews Indianapolis Speed Classics

The two Novi Governor Specials, entered by Louis Welsh, of Novi, Mich., have Bud Winfield designed 183 cu in. V-8 overhead cam, supercharged 550 hp engines. These cars, each with Kurtis-Kraft chassis and body, are the most powerful racing cars in America today. While most Indianapolis engines are 270 cu in., unblown, the Bud Winfield 183 cu in.

V-8 is supercharged, bringing the hp rating up to 550. The cars will be the same as last year with the following modifications: Improved Firestone fuel cells with 115 gallon capacity; Scintilla magneto in conjunction with a special distributor manufactured by Winfield Engineering; forged I-beam connecting rods; copper lead inserts both main and connecting rod bearings; and a larger radiator with improved air flow for better cooling to permit using either gasoline or alcohol fuel.

The Novi Specials will have the only V-8 type engines in the race. All others will be equipped with inline style. These Novi Special engines will turn up better than 8000 rpm.

The Novi Governor Specials have torsion bar suspension on the front and

semi-elliptic on the rear. Airflow is through the radiator directly underneath the car, instead of through the engine compartment as in the conventional models. Duke Nalon will drive one car. In the 1948 race he missed a win by running out of fuel a few miles from the finish to come in third. The other Novi, wrecked



Nat Rounds' new rear engine car, shown here with Bill Taylor who will be its driver and Emil Dietrich (right) one of its builders. (Acme photo).

This view of the Navi Special shows the inter-cooler air scoop which extends out in front of the oil and water cooling radiators of the car. The supercharger, barely visible at the rear of the engine, is fed by three Winfield carburetors through one common manifold. (Evans photo).

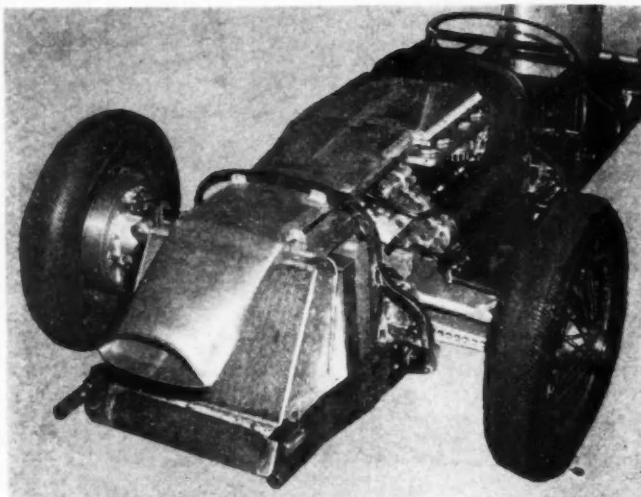
last year before the race, has been completely rebuilt and will be driven by Rex Mays, who, although he has never driven a front drive car, should have no difficulty in mastering this one.

Lou Moore will again have the two front drive cars, driven by Mauri Rose and Bill Holland, who have won first and second place respectively for two years. These Blue Crown Spark Plug Specials, with Meyer & Drake 270 cu in. Offenhouse engines, will be serious contenders again this year. Airflow on the Moore cars is into the engine compartment. The brakes are located against the differential housing, while the Navi cars have them on the wheels.

The front drive car, in my opinion, has an advantage on the 2½-mile Indianapolis track, which means that several other important contenders will bear watching in this year's race. Front drive cars can take turns faster, while rear drive cars must decelerate and check down speed or else they drift into the wall. Also, front drive cars pull the chassis around the turn and give better control. This characteristic, I believe, gives front wheel drive cars a definite five mph advantage.

In addition to his two Blue Crown Spark Plug Specials, Moore is entering a third car, the Blue Crown Spark Plug Special, Jr. It will feature a rear transverse spring system, with the transverse spring supported by the cross member back of the quick-change rear axle. Two sets of shock absorbers are used—friction and hydraulic types. The car has a Meyer & Drake four-cylinder 270 cu in. non-supercharged engine. (See AUTOMOTIVE INDUSTRIES, March 1, 1949, page 37.)

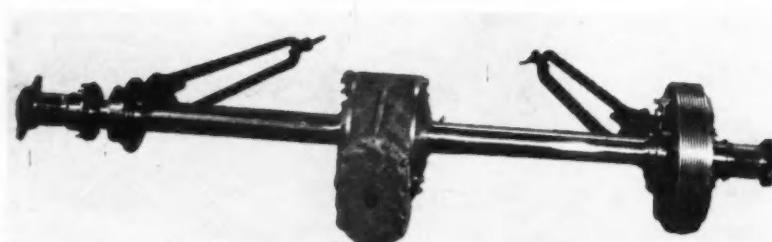
An interesting car to watch this year is the new



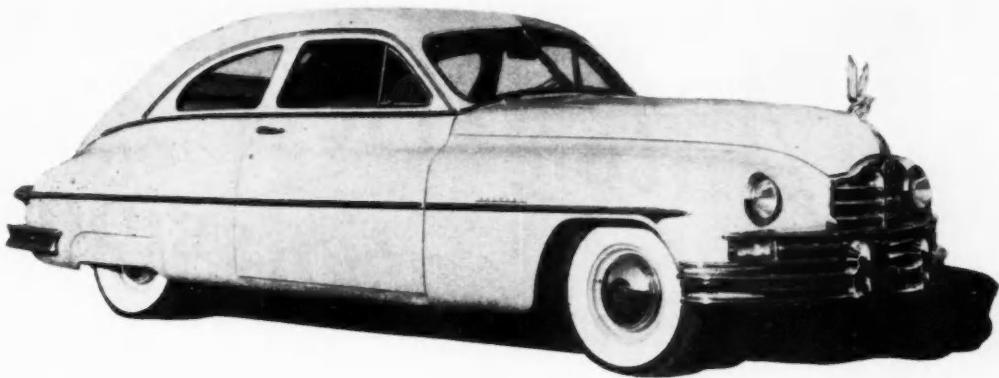
rear engine design of N. J. Rounds that is being built by Emil Diedt and Luigi Lesovsky. (As we go to press it is doubtful that the Rounds' car will be ready in time for this year's race at Indianapolis, according to its builders.—Ed.) Bill Taylor, 1948 California stock car racing champion, has been engaged to drive it. Rear engine cars have not proved too successful in the past. In recent years, four designed by the late Harry Miller have been entered, but never placed in the money. Handling of this type car is tricky because of the weight balance. The Rounds entry is tubular frame construction, with torsion bar independent suspension front and rear. The car is extremely low for Indianapolis racers. The body is streamlined, and well proportioned. The driver is seated at the half-way point, with fuel tanks in front and engine in rear. The power unit is a 270 cu in. Meyer & Drake.

Pat Clancy's six-wheel car, which ran in the 1948 race, is the first tandem type to appear at Indianapolis. This car should be watched, for the four-wheel drive allows a greater portion of power to be transmitted to the race track, resulting in higher average speeds.

(Turn to page 64, please)



Quick change rear axle used on Kurtis-Kraft racing cars. Note the straight-through tubular shaft.



Packard's new Golden Anniversary Super is powered by a 150-hp engine and is mounted on a 127-in. wheelbase.

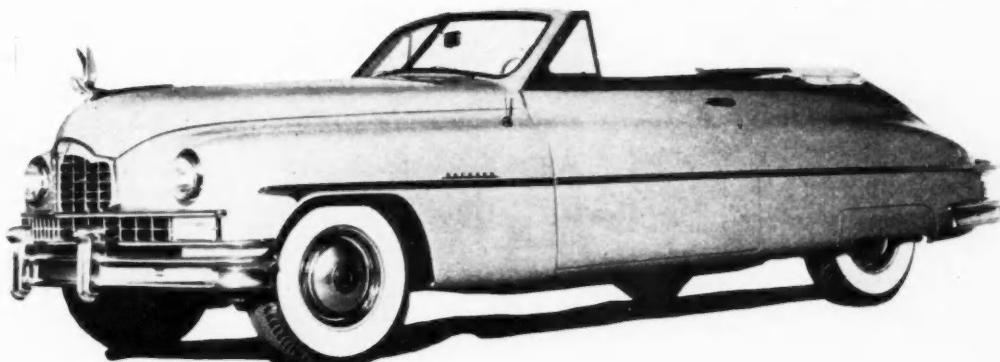
## Packard's Golden Anniversary Models

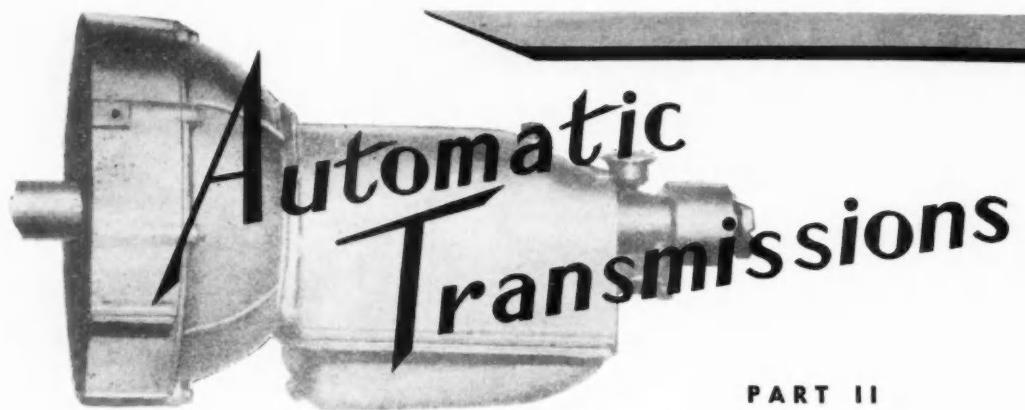
Celebrating its 50th anniversary this year, the Packard Motor Car Co. has announced that its new line of Golden Anniversary models includes 135-hp Eights on a 120-in. wheelbase; 150-hp Super Eights on a 127-in. wheelbase; and 160-hp Custom Eights on a 127-in. wheelbase. Compared to Packard's 1949 line, the new Eights are powered by 135-hp engines as contrasted with 130-hp, and the Super Eights by 150-hp engines as against 145-hp. The wheelbase of the new Super Eights is seven in. longer than the 1949 model. The overall length of the new Super

Eight has been increased to 211 11/16 in. from 204 5/8 in.

Packard's new Ultramatic Drive (described on the following pages of this issue) is standard equipment on the Custom Eights, and will be offered as optional equipment on the Super Eights and Eights. The new models are available in 14 different body types including a limousine, seven-passenger sedan, convertible, and station sedan.

Equipped with Ultramatic Drive, this new Golden Anniversary Packard Custom convertible is powered by a 160-hp engine.





# Automatic Transmissions

## PART II

This article Is the Second of a Series on Modern Automatic Transmissions.  
The First Article, by P. M. Heldt, was Published in the April 15 issue of  
AUTOMOTIVE INDUSTRIES.

By Joseph Geschelin

THE long awaited announcement of the Packard automatic transmission is being made at this time with this new mechanism being made available as standard equipment on the Custom Eight line and as optional equipment on the Super Eights and Eights.

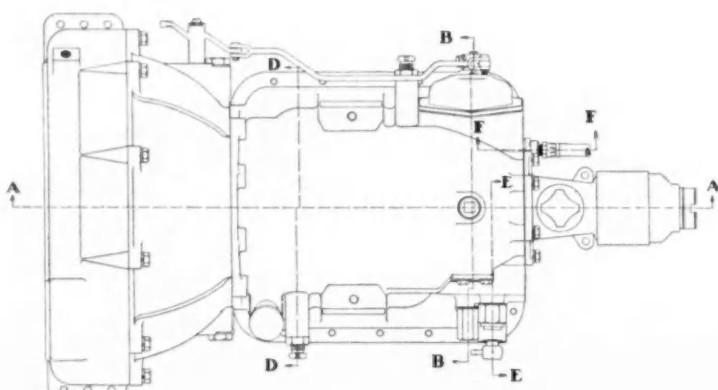
Now that the wraps are off, it is of interest to find that the "Ultramatic" drive is of unique torque converter type, featuring a three element converter with but one reactor stage for torque multiplication. Yet with this arrangement Packard is able to attain torque multiplication of the order of 2.4 to 1.

Distinguishing feature of the device is the provision of a direct drive clutch of mechanical type so designed

as to function properly in solid oil. As will be explained later the direct clutch is applied hydraulically through the action of a special type of centrifugal governor. The torque converter, unlike other commercial designs, is used only for acceleration and is cut out automatically by selective action of the governor and throttle pressure when the direct clutch is applied. This gives a direct mechanical coupling for most driving conditions.

On the other hand, since the mechanism responds to a combination of governor and throttle pressure control, through the control valve system, the driver can overrule governor control at will—under most driving conditions—and thus has available a combination of selective operating conditions. For example, it is possible to have direct drive in both high and low range; or torque converter drive both in high and low

range. Under ordinary driving conditions the direct clutch is engaged at around 15 mph with part throttle. But throttle pressure can overrule the governor even with maximum throttle, up to a road speed of around 50 mph. At that speed, as a measure of safety, governor control will overrule throttle pressure.



Top external view of the Packard automatic transmission. Sections shown in other drawings are indicated on this illustration.

# Major Features of Packard's New Automatic Transmission

In addition to the forward portion of the mechanism mentioned above, the unit contains a planetary gear set — of familiar type and with practically the same controls as are known commercially. Planetary gear set operation is designed to provide reverse and emergency low maneuvers. A distinctive feature is that the gear ratios for these maneuvers are not the same. Reverse has a ratio of 1.64 to 1, while emergency low is 1.82 to 1.

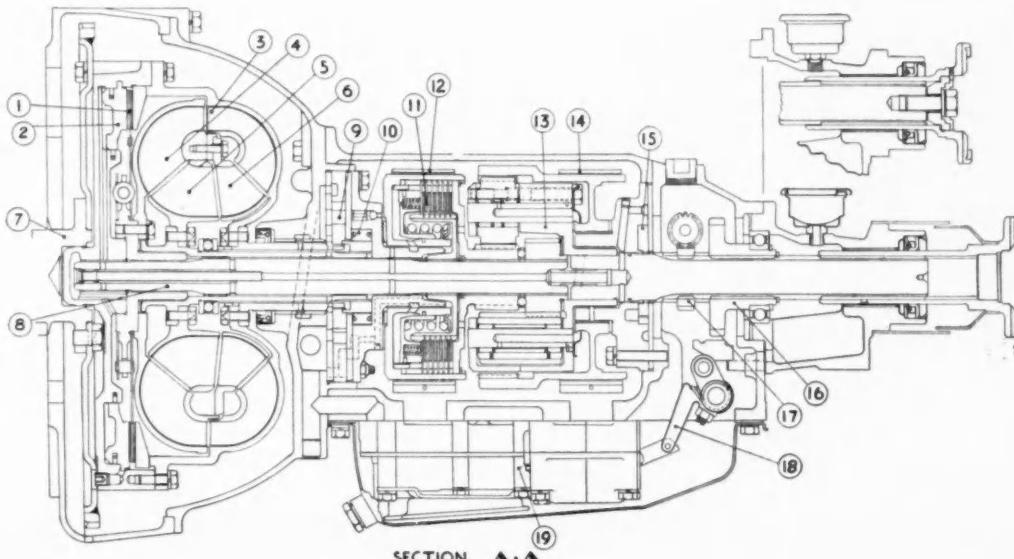
From the standpoint of the driver, operation is simple and requires no explanation, except perhaps the fact that there is no clutch pedal. The only functions that concern the driver are those of moving the hand lever on the steering column to the desired position and pressing the accelerator pedal. Five such positions are available selectively—"P" for parking, "N" for neutral, "H" for high range, "L" for low range, and "R" for reverse. As the driver selects the

*Latest Mechanism to Be Introduced in Passenger Car Industry  
Combines Mechanical Direct Drive Clutch with Hydraulic  
Torque Converter of Three Element Type*

desired position, the movement of the linkage shifts the selector valve mechanically into the proper port position.

Parking position is intended solely for holding the car on grades or hills to provide complete mechanical lock-up with the rear wheels. The low position is

*Longitudinal section A-A of the Packard automatic transmission.  
1—Direct drive clutch. 2—Direct drive clutch piston. 3—Converter pump. 4—Converter first turbine. 5—Converter reactor. 6—Converter second turbine. 7—Crankshaft. 8—Output shaft from converter or direct clutch. 9—Front oil pump. 10—Reactor overrunning clutch. 11—High range clutch. 12—Low range brake band. 13—Low and reverse planetary gear set. 14—Reverse brake band. 15—Rear oil pump. 16—Parking member. 17—Speedometer and governor driving gear. 18—Selector valve inner lever. 19—Control unit.*



Hydraulic circuit when operating in high range through the converter of the new Packard automatic transmission. A—Direct drive clutch. B—Converter. C—Converter check valve. D—Front pump. E—Front pump relief valve. F—Pump check valve. G—Pump selector valve. H—High range clutch. K—Modulating valve. L—Throttle valve. M—Low range brake piston. N—Selector valve. P—Timing valve. R—Direct drive shift valve. S—Low range brake. T—Governor. V—Rear pump. W—Reverse brake. X—Reverse brake piston. Z—Oil cooler.

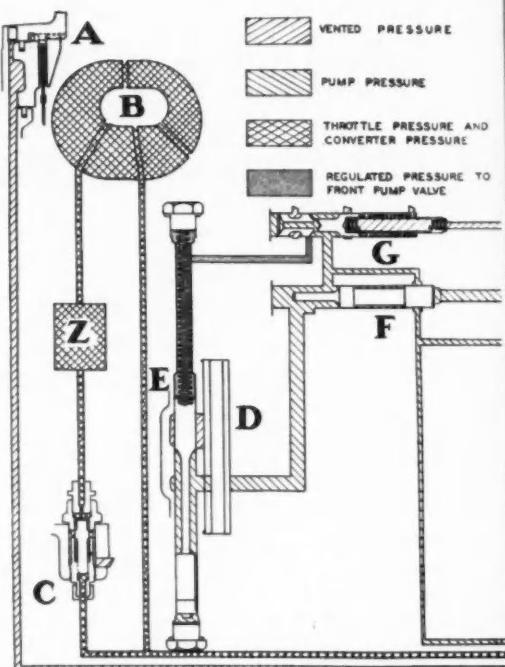
intended only for emergencies or for unusual acceleration.

It is also of interest that the only electrical element is a switch, so arranged as to permit engine starting only when the control lever is in "P" or "N".

From a driver standpoint it is important to know that the device permits "rocking" of the car to get out of ruts or bad spots. This is done by moving the control lever back and forth from "L" to "R". Push-starting in the event of a dead battery, for example, also is said to be a simple maneuver. Here the lever is to be placed in "N" position and held there until the car is moving about 20 mph. Then the lever is shifted into "H" where the mechanism will run with direct mechanical clutch "in", with the rear pump supplying oil pressure, until the engine starts.

The mechanism will be provided with a factory-installed oil cooler of simple design as standard equipment, primarily to take care of unusual operating conditions.

Because of the complexities of tracing the operating phases of a device of this character, and the difficulty of providing a word picture of the inter-relation of the various control functions, this article will be limited to a description of mechanical and hydraulic elements, using the assembly drawing as a guide. To simplify the visualization of the action of the oil pressure system, Packard



has supplied a complete diagram for one of the maneuvers—high range converter.

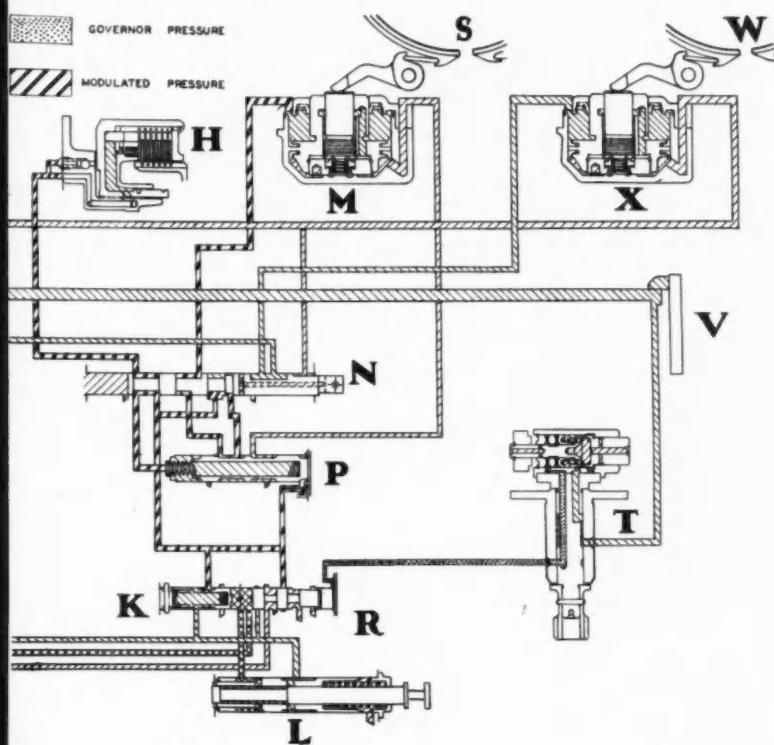
Let us consider now the features of the major elements of this device. Briefly, these elements are as follows:

- 1—Torque converter
- 2—Direct clutch
- 3—Planetary gear set
- 4—Governor
- 5—Hydraulic pumps
- 6—Control valves

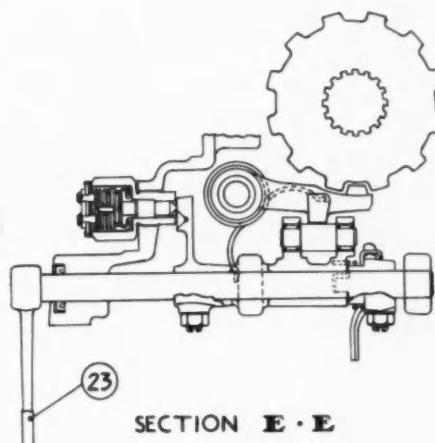
The torque converter assembly, as illustrated, consists of three main members, although four elements appear in cross-section. The first turbine is near-

*Cross section D-D. 25—Low range brake piston. The small center member of the piston takes up clearance between the band and drum before the band is clamped by the large piston.*

## Packard's Automatic Transmission



Cross section E-E. 23—Selector valve outer lever. Note the toothed wheel and pawl arrangement for locking the shaft and gear system when the car is parked.



SECTION E-E

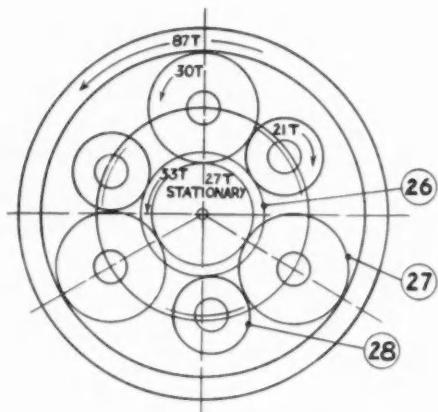
est to the engine end and has bolted to it the smaller diameter second turbine stage which is seen nearest to the pump. Being bolted together they operate as a unit. The pump, which also serves as the housing for the assembly, is at the rear and is carried forward to bolt to the flexible disk on the crankshaft. The latter replaces the conventional flywheel, since the entire mass of the converter is now a part of the flywheel system. The disk also serves to provide the flexibility required in a complicated system of this nature, making up for any tendency to misalignment at any time.

The reaction member is between the first and second turbine stages and is mounted on a sleeve which terminates at the bulkhead with a one-way clutch of sprag type. The overrunning clutch serves to lock the reaction member during the phase of torque multiplication, then releases it when the coupling point is reached. The converter then acts as a coupling until the direct clutch engages. Consequently, the reaction member is free to rotate at all times except when torque multiplication is required.

The first and second turbine elements are made with formed blades having a rounded nose and sharp exit.

The pump blades, too, have a rounded nose and sharp exit but incorporate a constant section for the major portion of the length of the blade measuring from the nose. The second turbine element is so formed and positioned as to control flow into the pump to achieve a rising input speed curve, starting with an engine speed of around 1600 rpm. At the same time it has the effect of extending the clutch point for smooth

# Packard's Automatic Transmission



Planetary gear set in low range as seen from rear. 26—Rear sun gear. 27—Short pinion. 28—Long pinion.

engagement. Through the action of modulator valving the torque converter contains an oil pressure of about 30 psi.

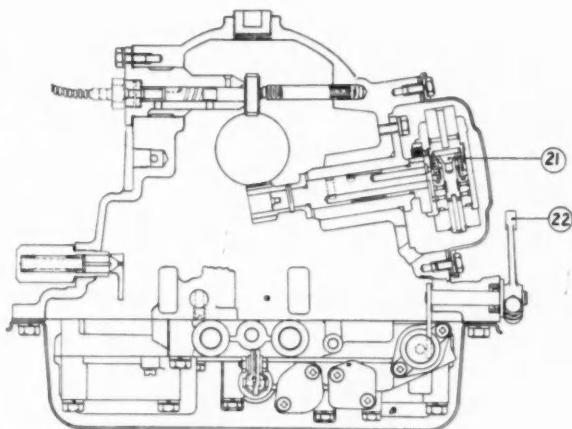
The direct clutch — the mechanical clutch at the engine end — is a single plate member of familiar design, having a balanced spring damper drive similar to the dampers used by Packard in their conventional clutches. However, since the clutch must operate constantly while submerged in solid oil, it is fitted with a specially designed cork facing on both sides of the plate. It is claimed that this design functions perfectly under the conditions specified.

As illustrated, both the turbine member and the clutch driving plate are bolted to a common flange and rotate

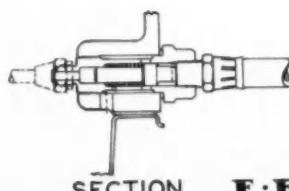
together. This flange, in turn, is attached to the shaft which extends through the entire unit to the rear sun gear of the planetary train. As mentioned earlier, the clutch is actuated by the governor, engagement being effected by applying oil pressure through the piston which is integral with the pressure plate.

In the planetary gear set, the rear sun gear is splined to the shaft which is attached to the flange at the forward end, the same flange also being attached to the turbine element. As illustrated, the gear set has three long pinions and three short pinions meshing with them. Rotation of the rear sun gear engages the long pinions and, in turn, the short pinions.

The high range clutch is of familiar multiple-disk type and is actuated by hydraulic pressure on the piston. This has the effect of engaging the front sun gear. To provide rapid but controlled movement of the clutch, it is provided with a pressure relief hole, vented to the atmosphere, the function being to separate the first plate of the multiple disk group.



Cross section B-B. 21—Governor. 22—Throttle pressure control lever.



Longitudinal section F-F.  
Converter pressure regulator.

The brake band for low range operation is mounted on the OD of the high range clutch. In this phase the forward sun gear is held stationary, causing the short pinions to move in the same direction as the rear sun gear, "walking" around the front sun gear in clockwise rotation. This gives a reduction of 1.82 to 1.

For reverse, the reverse band clamps the OD of the ring gear and the pinions are caused to "walk" around the ring gear (instead of the sun gear as for low) in counterclockwise rotation. In this case the gear ratio is 1.64 to 1.

(Turn to page 68, please)

# Eaton's Remodeled Facilities for Developing Heaters and Defrosters

RECENT remodeling of the Engineering Laboratory of Eaton Manufacturing Company's Heater Division, which manufactures automobile heating, defrosting and ventilating equipment exclusively for the car and truck manufacturers, has improved its facilities for developing those products. At the request of an automotive manufacturer a heating, defrosting and ventilating unit for a future car starts on the design board in its drafting room. The design then goes to the fabrication and model shop. From there the completed model heater is sent to the Experimental Laboratory where numerous tests are made on the heater as a whole and also on its components. The accompanying photograph (Fig. 1) illustrates a life test on a motor and blower assembly, the rpm being measured with a stroboscopic tachometer. The motor life and wheel balance of this assembly are also tested at this bench. In addition, any electrical parts which come into a heater assembly, such as switches, wiring, motors, etc., are tested here. Fourteen motors or motor and blower assemblies can be run simultaneously; these motors can be run continuously or they can be intermittently started and stopped during a test to determine endurance. The length of these life tests, of course, depends upon the specific application. However, at the end of each run the motors are carefully examined for balance, bearing and brush wear.

At the water test bench other heater component tests are made. Any parts of the heater which are exposed to water such as hose, valves or cores are given a rigid test. These parts are tested for pressure drop, bursting pressure and leakage. Water at a temperature of 180°F, the maximum normal temperature of water in a car circulating system, is customarily used at this bench, but lower temperatures can also be used if desired.

Component tests on the heater cores are made at the core test wind tunnel where cores are studied for heat transfer charac-

(Turn to page 62, please)

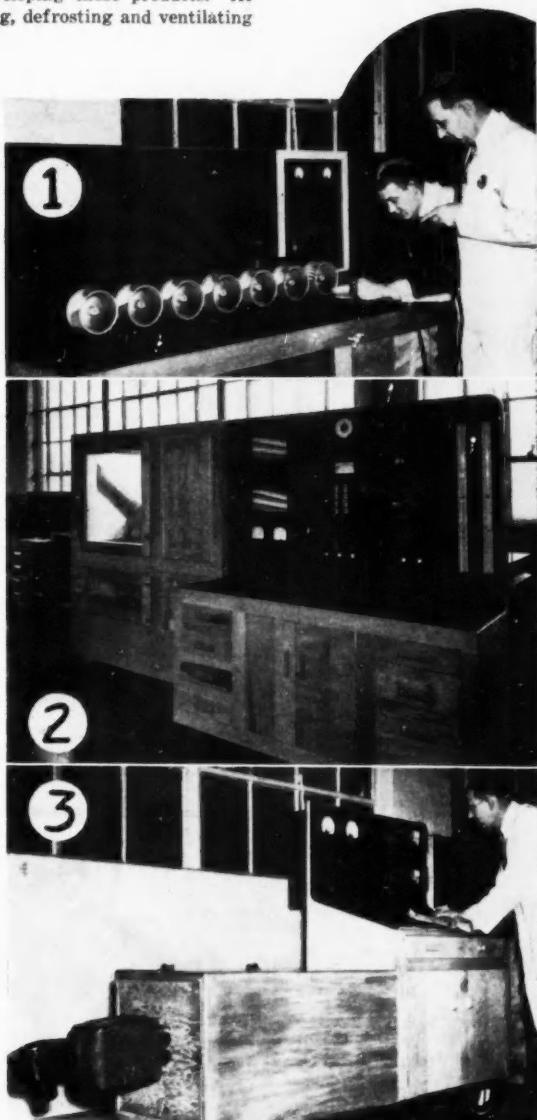
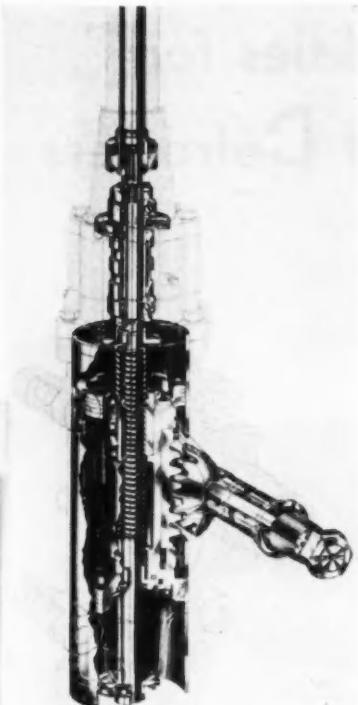


Fig. 1—Motor and blower assemblies undergoing life tests. Their speeds are being measured with a stroboscopic tachometer.

Fig. 2—Major wind tunnel for testing completed experimental heaters.

Fig. 3—This wind tunnel is used for testing production units.



Bendix Introduces

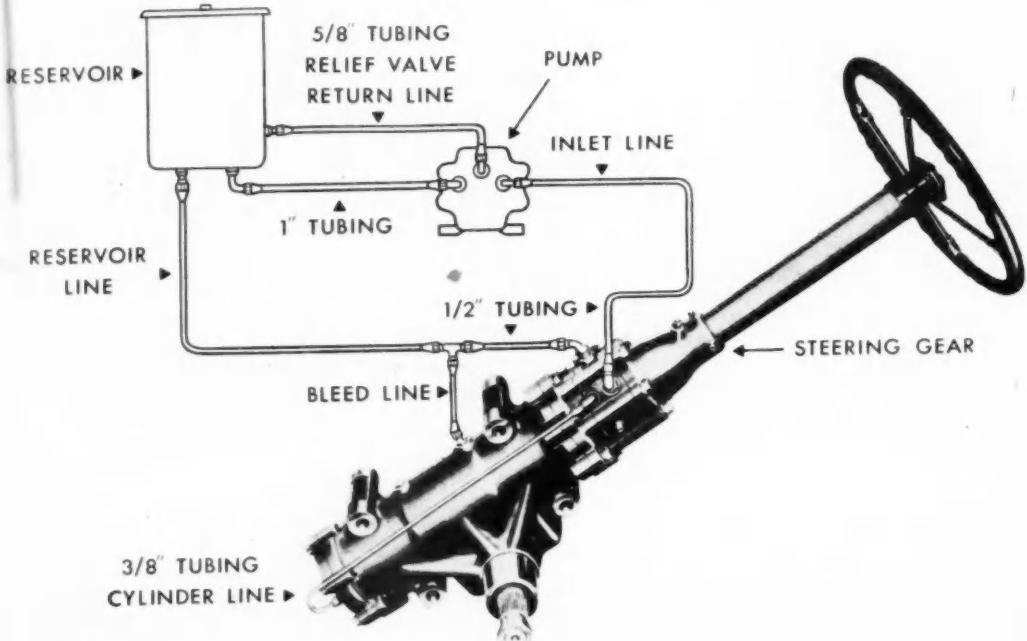
# Power

**F**IRST announcement of a power steering gear with the Bendix name is made by the Bendix Products Div., Bendix Aviation Corp. This unit is a self-contained hydraulic steering gear of worm-and-nut type used in combination with a hydraulic power cylinder and control valve. It is said to be easily adaptable for any type of chassis.

Safety is stressed in the operation of this device, since the control valve is said to assure instant and complete

(Left) Cut-away phantom view of the Bendix steering gear showing location and design of its principal parts.

(Below) Schematic arrangement of units and piping connections of the Bendix hydraulic power steering gear.



# Steering Gear

steering control, automatically, in the event of soft shoulders, road obstructions, or tire blow-out. This eliminates all need for fighting the wheel in an emergency. Safety is further increased by a reduction in driver fatigue.

As illustrated, the hydraulic power cylinder is built into the steering gear housing, both power cylinder and control valve being concentric with the steering column. The worm and nut element serves principally to operate the control valve instead of furnishing the power for steering movement as in conventional gears. On the other hand, as a measure of safety, the gear will function manually in the event of damage or failure of the hydraulic system. The illustrations show the three phases of control valve operation—neutral, turn left, and turn right.

The installation drawing pictures a schematic arrangement of units and piping connections of the Bendix gear. The steering gear housing is so designed as to place the pitman arm shaft either to the right or left as desired. In special cases, the steering column can be supplied with an angle drive as well.

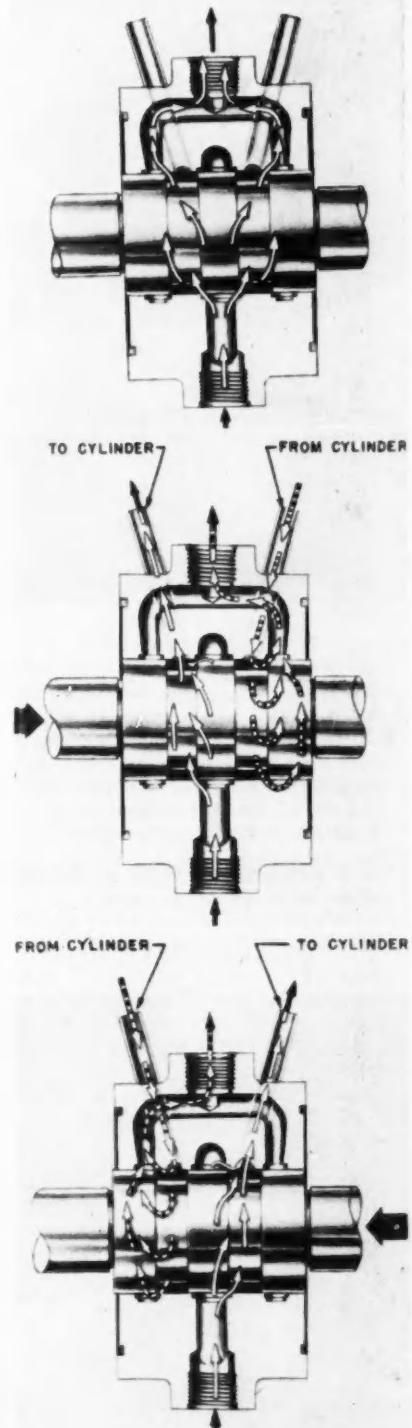
To complete the installation Bendix offers a heavy duty hydraulic pump of gear type of special design said to have high volumetric efficiency. It has oversized bearings and large ports to allow for overloads and high speed operation with minimum wear. A relief valve is built-in as an integral part of the pump.

Pump drive is through a quill shaft having extra bearings to take radial loads where a pulley drive is used. Pump drive may be either clockwise or counter-clockwise by altering the position of the rear end plate.

(Top right) This diagrammatic section through the control valve shows it in neutral position. Fluid from the pump is circulating to the inlet port and through the return port manifold to the reservoir as shown by the arrows.

(Center right) The control valve is shown here in position for turning left. The valve spool is moved to the right, blocking the right hand cylinder port and thus preventing pressure from reaching that side of the cylinder. Fluid is bypassed through the return passage as shown by the dotted arrows. The left hand cylinder port carries full pump pressure.

(Lower right) When the control valve is in position for turning to the right, as shown here, fluid at high pressure is admitted to the right hand cylinder port. At the same time, fluid is released from the opposite end of the power cylinder and allowed to return to the fluid system reservoir.



# White's New Has Powered



*White's new delivery truck chassis with refrigerator body.*

WHITE'S newest trucks, the 3000 series, have been developed especially for the delivery of merchandise where frequent stops are necessary and traffic conditions are difficult. Wide doors and an extremely low cab floor are designed to reduce drive fatigue, and a large windshield contributes to safety.

Three models are available in the 3000 series. These are the Model 3016 equipped with a 110-hp engine, the Model 3018 with a 114-hp engine, and the

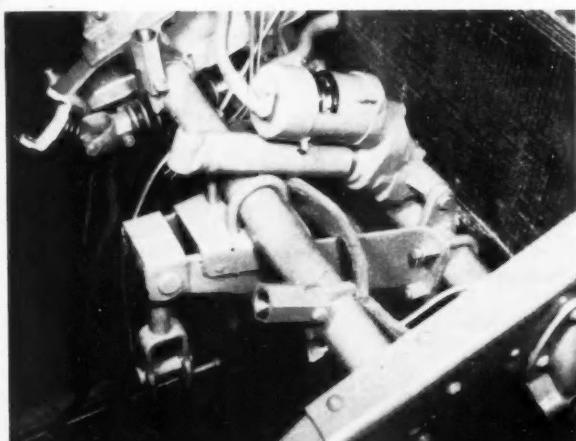
## Condensed Specifications of 3000 Series White Trucks

MODEL	3016	3018	3020
Number of Cylinders . . . . .	6	6	6
Bore & Stroke (In.) . . . . .	3 $\frac{3}{4}$ x 4 $\frac{1}{2}$	3 $\frac{7}{8}$ x 4 $\frac{1}{2}$	4 x 4 $\frac{1}{2}$
Displacement (Cu. In.) . . . . .	298	318	340
Brake, Hp. . . . .	110	114	120
Torque @ 1200-1400			
Rpm (Lb.-Ft) . . . . .	230	250	270
Governed Engine, Rpm. . . . .	3190	3000	3000
Rear Axle Gear Ratios . . . . .	5.29; 6.17; 6.8; 7.2	5.11; 5.71; 6.43; 7.17	
Gross Ratings (1000 Lb.) . . . . .	14; 15; 17	15; 17; 19	17; 19; 21
Wheelbases (In.) . . . . .	85 $\frac{1}{2}$ (Std.); 97 $\frac{1}{2}$ ; 109 $\frac{1}{2}$ ; 127 $\frac{1}{2}$ ; 145 $\frac{1}{2}$ ; 163 $\frac{1}{2}$ ; 181 $\frac{1}{2}$		

Model 3020 which has a 120-hp engine. All engines are six-cylinder L-head type with integral crankcase and cylinder block. Exhaust valve seat inserts are chrome molybdenum steel, Stellite faced. Valve tappets are Zero-Lash hydraulic.

An outstanding feature of these trucks is their power tilt cab arrangement. A storage battery powered electric motor operates mechanical screw hoist to lift the cab, including front fenders and other sheet metal, through a 90-deg arc in 25 seconds. With the cab tilted, all units from the front axle back through the transmission are accessible for repair or adjustment. The cab is hinged at the front end of the frame.

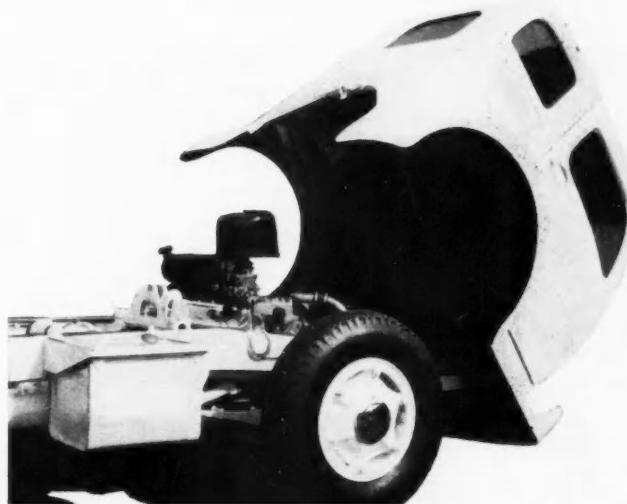
A crash guard in front of the cab is mounted to the bumper and trussed directly back to the frame. Electrical equip-



*This illustration shows the mechanism which tilts the cab assembly. It is mounted on a tubular cross member of the chassis frame and consists of a six-volt motor (Delco Products Actuator), a gear reduction train and a screw jack which, when assembled, is shackled to the cab.*

# Truck Tilt-Cab

*When the cab is tilted, power plant and cooling system units are accessible for repair or adjustment. Air is brought in to the carburetor through a duct which leads to an opening in the cab below the right side window. The cooling system is filled through a small cylindrical tank shown to the left of the carburetor.*



ment at the back of the instrument panel is accessible by detaching a ventilator bracket and opening the screen back of the ventilator shutter.

The driver's seat is adjustable both for height and leg distance. Forced air circulation in double panels under the seat, behind the seat, and under the rear

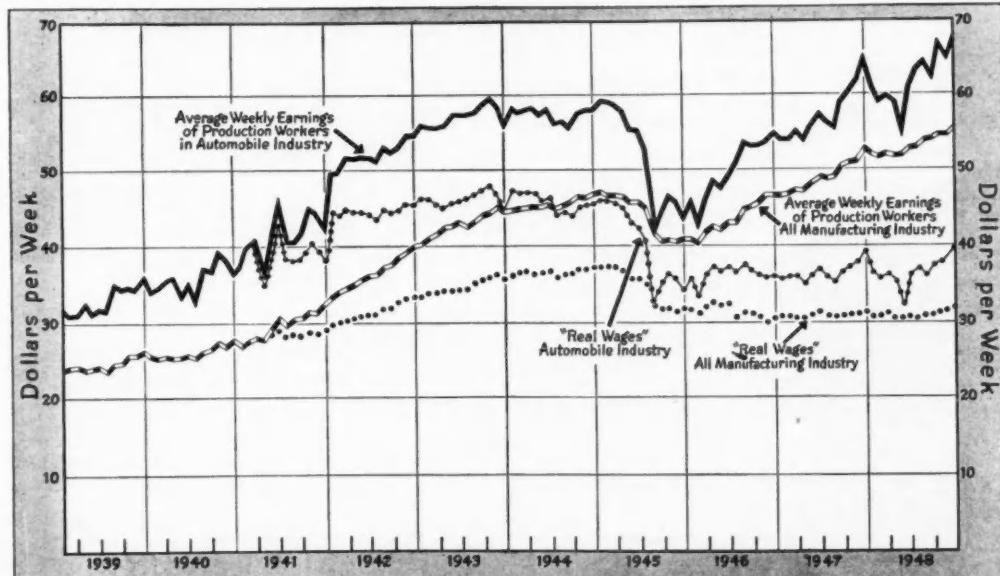
deck provides adequate insulation from engine heat.

Recommended minimum body lengths range from 7 ft for the 85½ in. wheelbase chassis to 21 ft for the 181½ in. wheelbase chassis; maximum body lengths from 8½ ft for the 85½ in. chassis to 22 ft for the 181½ in. chassis.

## Weekly Earnings and "Real Wages" of Production Workers in the Automobile and All Manufacturing Industries

(Based on Data from Bureau of Labor Statistics)

"Real Wages" are average weekly earnings divided by cost of living factor.



# American Trucks European



*Above: The port of Rotterdam is being rebuilt with the aid of such equipment as this ECA-financed truck trailer and dragline.*

*Right: Trade is being revived with the help of American trucks. This one is being loaded with oysters at Zeeland.*

*Below, left: This truck, used by the Netherlands Red Cross in its campaign for blood plasma, is one of the many types financed by ECA.*

*Below, right: American trucks carry material for one of the many new buildings under construction in Rotterdam.*

THE people of Marshall Plan nations are seeing for themselves how thousands of new trucks, financed by American aid, are speeding up the vast European recovery program. More than 100 of these American trucks, each bearing the red, white and blue Marshall Plan label, took time off from work recently to parade through the streets of The Hague in celebration of "Truck Day" in the Nether-



# Speed Recovery

lands. They ranged from huge semi-trailers to lightweight trucks and jeeps, and were part of the \$25,800,000 worth of motor vehicles, parts and accessories which the Economic Cooperation Administration authorized for the Netherlands from April 3, 1948, to Jan. 31, 1949. During that same period, authorizations for motor transport equipment for all participating countries totaled \$87,700,000.

Displaying posters with the slogan, "Better Transport Through Marshall Help," the trucks in the Hague parade rolled along streets lined with spectators who, not so long ago, were faced with a badly-damaged transport system. Holland's prewar fleet of about 28,000 trucks had been reduced to 7000 at the end of the war; it now has about 34,000 vehicles.

With the exception of Belgium-Luxembourg, the Netherlands has received more Marshall Plan aid in the field of motor vehicles and parts than any other participating country. Belgium-Luxembourg received authorizations for \$27,700,000 — 32 per cent of the \$87,700,000 authorized for the April 3, 1948, to January 31, 1949, period. Other authorizations were: United Kingdom — \$1,100,000; France — \$8,200,000; Italy — \$200,000; Bizon Germany — \$4,000,000; Austria — \$300,000; Greece — \$5,300,000; Denmark — \$3,000,000; French zone Germany — \$2,200,000; Norway — \$100,000; Ireland — \$7,700,000; Sweden —

\$1,800,000, and Iceland — \$200,000.

The bulk of the motor vehicles was authorized for purchase in the United States which is supplying \$86,100,000 worth. More than \$1,400,000 worth are to come from Canada and the remaining \$100,000 from participating countries.

Under present plans, the Economic Cooperation Administration will put less stress on railway expansion and give more attention to building up the trucking industry of Marshall Plan countries.

Currently, European requirements for overall transport equipment are expected to be considerably reduced below the \$140 million originally estimated for the coming year. Many freight cars purchased during

(Turn to page 56, please)

A motorcade of 122 trucks financed by American dollars lined up near The Hague. Most of them had already been in use although some had just been unloaded from the boat that brought them from the United States.



Here is a new truck chassis being unloaded at Rotterdam. It bears the ECA emblem which reads "For European Recovery. Supplied by the United States of America."



# Machining Slipper-Type Piston for

**W**ITH the introduction of the slipper type piston for the 1949 Cadillac V-8 engine, it was found necessary to make some radical changes in the method of handling work in the machine shop to meet certain special problems. As illustrated, the piston is of slipper type and made of aluminum alloy. A major problem in machining is that conventional chucking would be sufficient to cause distortion of the skirt.

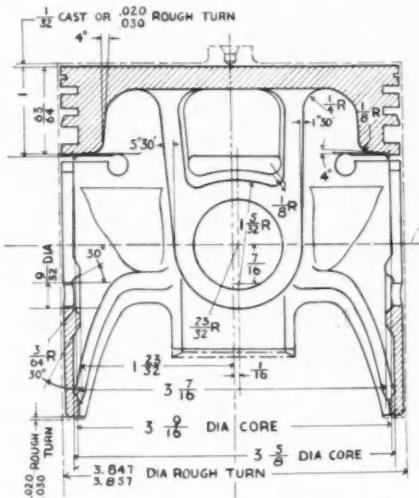
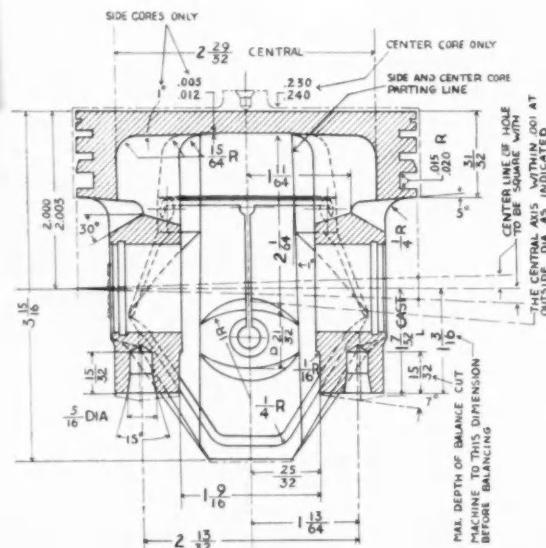
Added to this are the special requirements of the new high compression engine which demand still closer attention to fine tolerances. For example, the relation between the piston head and center of the piston pin bore is more exacting than ever because of the closer control required with high compression ratios. This distance is held within a tolerance of 0.002 in. At the same time the axis of the bore is maintained parallel with the head.

Despite these painstaking requirements, pistons are produced at a rate of 200 per hour, using some of the original machinery, although a number of new machines have been introduced in the line.

To assure conformity to engineering specifications, without the use of the conventional method of chuck-

ing at the open end, Cadillac has developed a means of locating the open end with a special adapter which follows the piston through the gamut of operations. As illustrated, the open end has two large pads in which are drilled and reamed two tapered holes. In the new set-up a vital operation is the first step where the two pads are faced with an end mill at one station, then the two taper holes drilled and reamed at successive stations.

Spacing of the tapered holes is held to a tolerance of 0.0002 in. Following this operation the adapter is fitted into the open end and remains with the same piston until the sequence of operations has been completed.



(Above) Longitudinal section of piston at right angle to piston pin hole. This is a shop drawing.

(Left) Longitudinal section of new slipper type Cadillac piston, showing details of heavy pads and location of taper holes for work holding during machining stages.

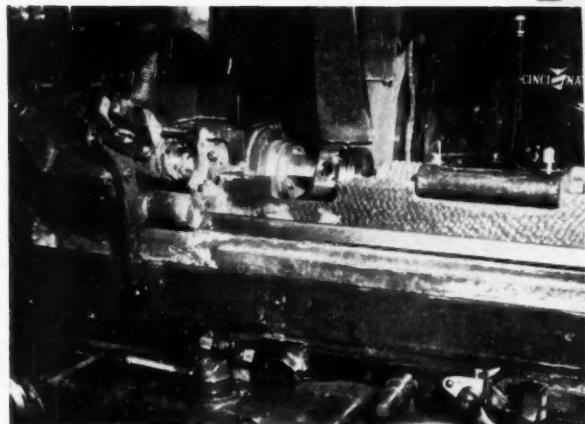
# High Compression Engine

By Joseph Geschelin

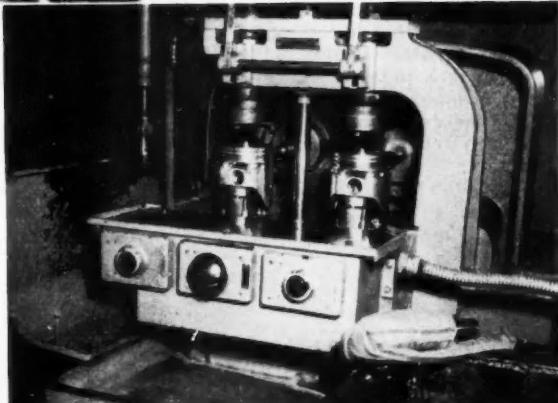
Rough- and finish-turning of the OD and piston ring belt is done in the familiar automatic lathes used heretofore. The T-slot is produced in a newly installed high production special machine of automatic indexing type. This requires the preparatory drilling of four holes, then the milling of a longitudinal and a vertical slot on each side.

Among the new machines installed on this line is the two-spindle precision boring machine, shown here. Said to be the latest one of its type in use, this machine bores the piston pin holes, previously rough-bored in

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(Above) Closeup of work station of one of the new external grinders fitted with a special cam-grinding attachment for elliptical grinding of the skirt. The entire cycle is automatically controlled and timed by means of an electronic cabinet set up to one side of the machine.



(Right) Closeup of work station of the new precision boring machine for boring piston pin holes. It is of two station type, features a special cycle of fast cutting coming in, and a light return cut to finish.



(Above) This is a view of the elastic piston checker in the inspection booth, used for grading pistons in 20 different diameters, varying by 0.0001 in. increments. The storage chutes for the different sizes may be seen at the right.

# Determining Stresses

By Given Brewer

Consulting Engineer



Fig. 1—Steel ingots were used to apply the 220,000 lb load to the Carryall trailer. This setup, consisting of the 110-ton low bed trailer and its trailer adaptor, both built by Fruehauf Trailer Co., and powered by a Peterbilt 286 hp tractor of 205 in. wheelbase, is claimed to be the world's largest highway transportation unit.

GOOSENECK platform trailers or Carryalls proved their usefulness during World War II when they were used extensively for hauling heavy armored tanks from the zone of combat into repair depots. The gooseneck structure is dictated by design requirements that the platform of the trailer be low so that the load need be raised a minimum amount and yet be towable by a conventional tractor.

Recently a large gooseneck trailer was used to transport the huge lens for the Mt. Palomar observatory from the optical laboratories at the California Institute of Technology to the observatory at Mt. Palomar. At about this same time the Los Angeles Bureau of Power and Light requested bids on a very large Carryall to have sufficient capacity to transport a 110-ton transformer from the freight yards to the substation over ordinary highways.

This trailer was built by the Fruehauf Trailer Co. of California and is illustrated in Fig. 1 and sketched in Fig. 2. (For description see March 1, 1949, issue of AUTOMOTIVE INDUSTRIES, page 30.)

As may be seen from the illustrations, the platform load must be carried by the steel framing members aft to the 16

wheels and forward to the saddle yoke. The stresses resulting from these moments and shears are indeterminate in the region of the gooseneck and in the interests of future design as well as present it was decided to determine the stresses in the region of the gooseneck by means of the Baldwin SR-4 electric strain gages.

Accordingly some 20 SR-4 strain gages of the A-3 type were cemented to the three built up I-beams of

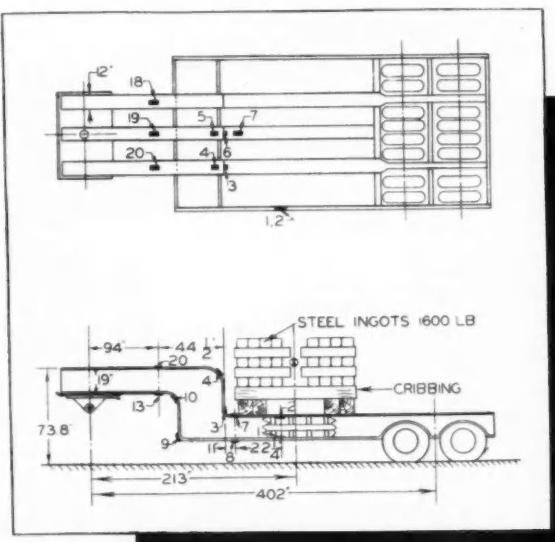


Fig. 2—Sketch of 110-ton Carryall showing location of strain gages and basic dimensions.

# in 110-Ton Gooseneck Trailer by Strain Gage Method

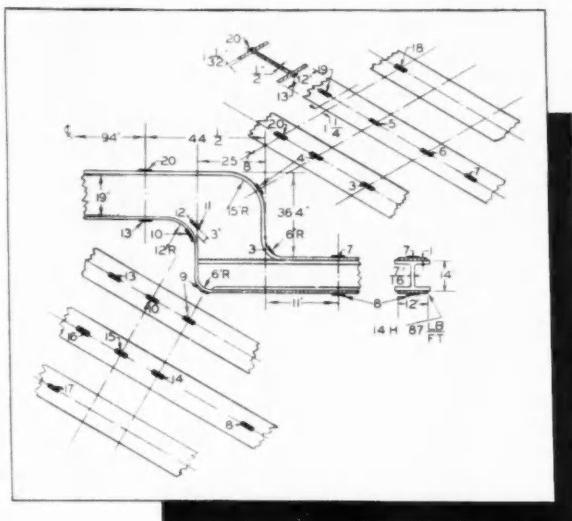


Fig. 3—Sketch of gooseneck showing placement of strain gages.

the Carryall with two gages on one of the side channels as shown in Fig. 2 and 3. Load was applied by means of a crane loading steel ingots atop a wooden cribbing as illustrated in Fig. 1. Strain readings were observed using an SR-4 strain indicator, Fig. 4, and a 20-channel switch. Readings were observed with increasing load with the wheels locked and under decreasing load with the wheels free to rotate.

So that the validity of the analysis could be checked, strain gages were placed on the three I-beams some distance ahead of the curved portions of the gooseneck. In this region the beam stresses may be readily calculated by simple elastic theory, therefore, if the stress calculations here checked the theoretical values, the stress determinations in the indeterminate portions of the

structure could be relied upon. In the testing of large structures of this kind, outdoors, it has been found that local heating due to solar radiation might introduce thermal strains which could not be separated from strains resulting from stress, in the subsequent analysis. In this test the recording apparatus lost sensitivity with each added tier of ingots due to the shielding effect of the large mass of steel upon the phasing of the balancing circuit within the indicator. For these known reasons and for other reasons frequently unknown that arise during tests of this nature it is always good practice to have a few gages on the structure where the stresses are known, as a check.

The heaviest steel plates cannot be relied upon to remain flat during loading and as a rule it is necessary to have strain gages on both sides of any plate if the true average stress is to be determined. Thus for the average I-beam, four gages should be attached to the top plate and four to the bottom plate of the "I" if the beam bending stresses are to be accurately determined. In this case the number of gages necessary was greatly

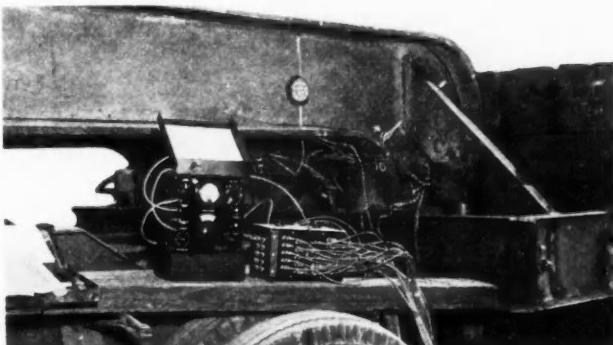


Fig. 4 — SR-4 strain indicator and 20-channel switch.

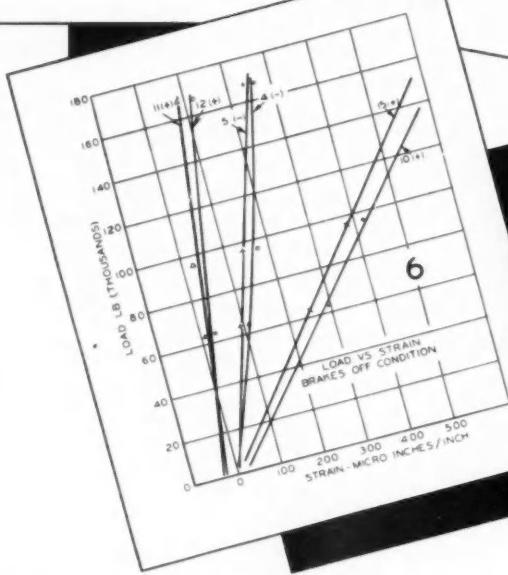
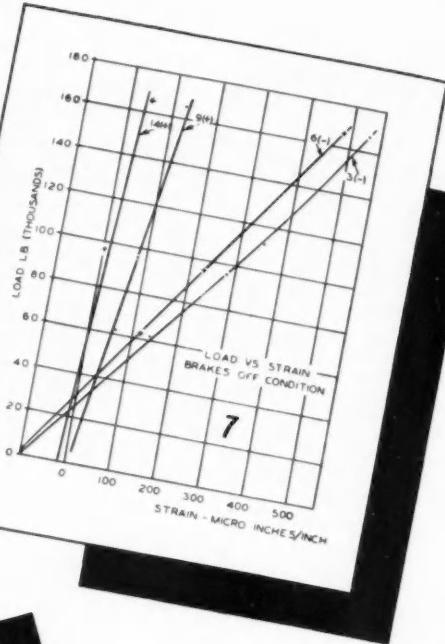
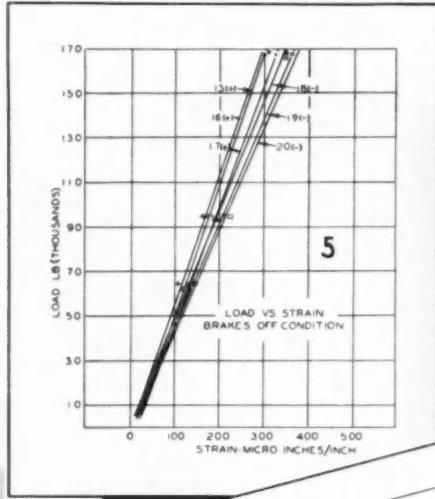


Fig. 5—(Upper left), Fig. 6—(left) and Fig. 7—(above) load vs strain curves for various gage locations (brakes off).

### Summary of Stresses and Locations @ P = 160,000 Lb

Gage Number	STRESS, PSI	
	Measured	Calculated
1	14100 psi	11150 psi
2	-13350	-11150
3	-18450	...
4	-7350	...
5	-7200	...
6	-18700	...
7	-9360	...
8	-12800	11890
9	3540	...
10	20250	...
11	3150	...
12	4200	...
13	8770	10120
14	1500	...
15	10200	...
16	5880	10120
17	8480	10120
18	-9910	-10120
19	-10500	-10120
20	-10870	-10120

#### NOTE

- Calculated stresses from  $f = \frac{M Y}{I}$   
 $M$  = Bending moment (in.-lb)  
 $Y$  = Distance from beam neutral axis to point of stress determination (in.)  
 $I$  = Cross sectional inertia ( $\text{in.}^4$ )
- Strains for stress determinations in brake off condition, taken from graphs by interpolation
- Young's modulus assumed to be  $30 \times 10^6$  psi

reduced through the stratagem of affixing the gages directly over the  $1\frac{1}{2}$  in. web of the girders. In this way local buckling of the beam cap at the point of gage attachment was impossible due to the restraint of the web, thus eliminating the necessity of backing gages. Therefore, the beam bending stresses could be determined with two gages in this instance instead of the usual eight. However, this point was also checked using the gages on the straight portions of the I-beams, gages No. 18 and No. 17, for example.

Plots of gage strain vs platform load were made and are carried in Fig. 5, 6 and 7. Strain is carried on the horizontal axis in micro in. per in. ( $\text{in./in.} \times 10^{-6}$ ). Platform load is given on the vertical axis.

As the modulus of elasticity for steel is about  $30 \times 10^6$  psi, the stresses at each point of gage attachment were determined by simply multiplying the gage strain, at any given load, by  $30 \times 10^6$ , the result being the stress. The stresses determined by this means for a platform load of 160,000 lb are

(Turn to page 74, please)

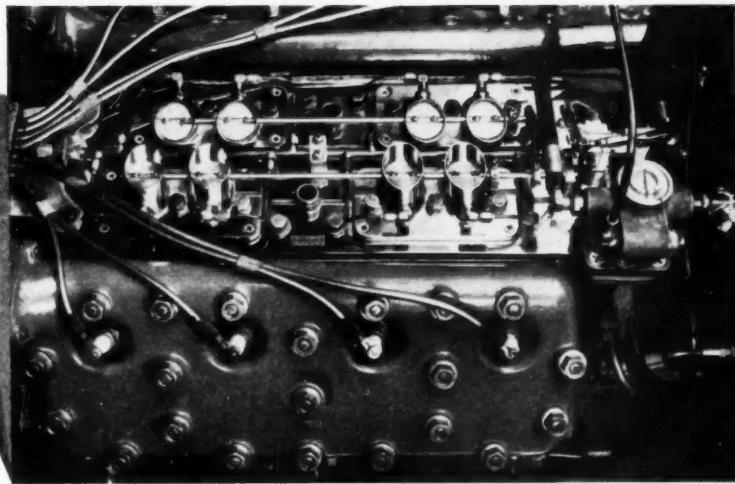


Fig. 1—Injection system built without a timing device as installed on a Ford V-8. Engine developed 190 hp after modifications to camshaft, heads, and ports.

## Unique Fuel Injection System Does Not Use Timing Device

A SIMPLE inexpensive fuel injection system, intended particularly for Offenhauser midget engines and for Ford and other "hot rod" engines, is a recent development of Hilborn Travers Engineering Co., Los Angeles. No timing device is employed—the fuel flows continuously to all of the nozzles.

A unit for use on Ford V-eight engines is shown in Fig. 1. It has eight individual throats, one for each cylinder. Separate butterfly valves controlling the air flow to each cylinder are mounted on two shafts, synchronized to open simultaneously. This is done by gearing at the rear of the unit, operated by linkage from the foot accelerator pedal. Fuel is supplied by a pump, driven by the camshaft gear train, and flows at 35 psi to a metering valve located in a small block

to the rear of the throttle shaft gears. This metering valve is connected by linkage to the throttle shafts so that it opens and closes with the throttles.

Opening and closing of the metering valve causes pressure to rise or fall in the line running to the nozzles at each throat. These nozzles are so constructed that a fine spray of fuel is discharged for complete atomization. Pressure from the pump is raised or lowered by turning an adjusting screw to select the desired air-fuel ratio.

The first production units are available for 100 cu in. Offenhauser midget engines (see Fig. 2) while equipment for Ford V-eight, Chevrolet and larger Offenhausers is fast nearing a point of completion.

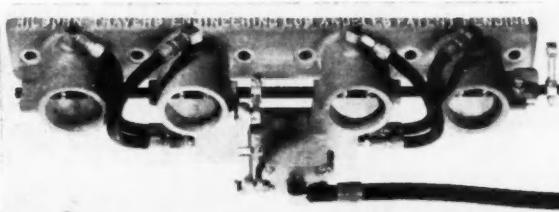
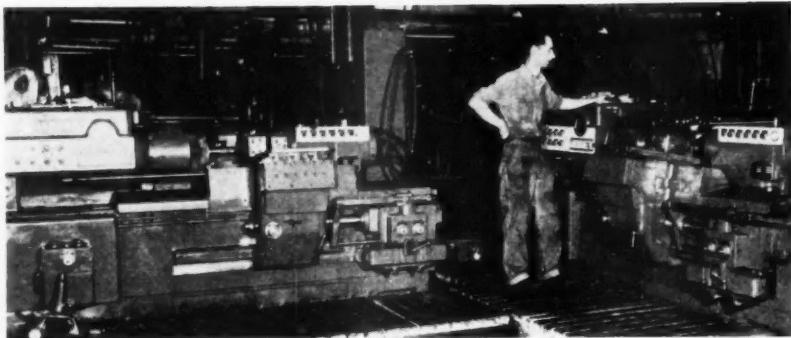


Fig. 2—The fuel injection unit now being manufactured for use on the Offenhauser midget engines completely replaces the carburetors formerly used. Fuel is sprayed in under pressure in the individual throats.



Steering knuckles are machined in heavier automatic lathes—the Morey automatics shown here.

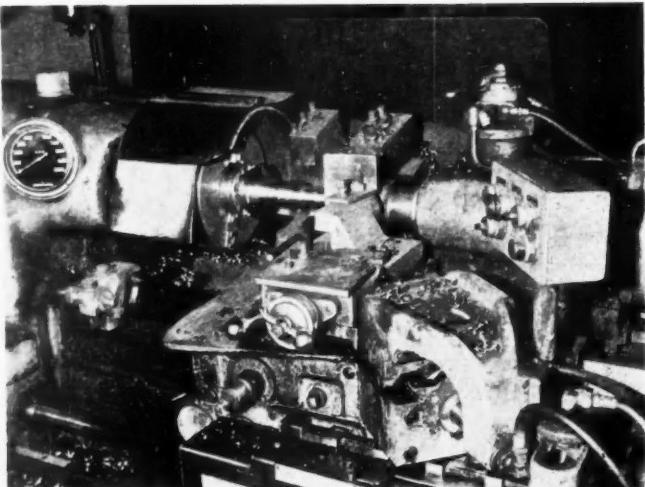
## High Production Turning of Rough forgings

OME impression of the amazing advance in high production turning of alloy steel parts may be gained from two examples in regular production at the Timken-Detroit Axle Co., Detroit, Mich. In one case they finish-turn heavy-duty rear axle pinions in a battery of three Monarch Mona-Matic lathes at the rate of about 70 pieces per hour for the group, with a single operator. In the other, they turn steering knuckles from the rough forging in a group of two massive Morey automatic lathes at the rate of 40 an hour for the two machines, with one operator. This production is at 80 per cent efficiency. In each case, the individual machine, operated at full capacity, is capable of considerably higher output.

Consider first the Monarch Mona-Matic operation. Timken has one of the earliest applications of this equipment to be found in the industry. In addition to being an extremely fast and powerful machine, the major feature of the Mona-Matic is the single Air-Gage tracer which is

employed in combination with a single-point metal cutting tool for turning. It has a completely automatic cycle with front tool and rear carriage tools guided automatically in a continuous cycle. The single cutting tool—in this case a solid three-cornered Kennametal block—cuts with light pressure, thus minimizing distortion and preventing the bell-mouthing of centers.

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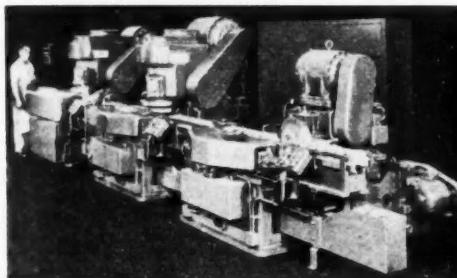
Closeup of Monarch Mona-Matic lathe tooling for turning the rear axle pinion at the stem end. One end of the template may be seen to the right in the foreground.

## B-80—Cylinder Head Milling Machine

Automatic transfer-type Rigidmil built by the Sundstrand Machine Tool Co., of Rockford, Ill., mills the top, bottom and both sides of cylinder heads. The machine consists of three milling stations, one turn-over station, an idle station and loading and unloading stations. All stations can be controlled from the master control button panel or individually from the station button control panels. The cylinder heads are shuttled from station to station by the return movement of the milling heads, making it unnecessary to have a separate shuttling device. A motor driven chip conveyor removes the chips from the machine.

The operator needs only to locate the cylinder heads on the loading station and press the cycle start button. After that, all movements are automatic. Each milling head has an automatic cycle of rapid approach, feed and rapid return. As the heads rapid return, each moves two work pieces—the finished piece out ahead of the cutter, making cutter relief unnecessary; and a rough piece, into milling position. All of the traveling heads are intertimed so that none will start the rapid return or shuttling movement until all are ready, thus making a pile-up of work pieces at any one station impossible.

At the first milling station, a 25 hp traveling head, with one vertical and one horizontal spindle, mills the top and the left side (accessory mounting bosses). At the turn-over station, the piece is turned 180 deg, making the bottom side up. At the next milling station, a 40 hp traveling head with one vertical spindle, mills the bottom (contact face) of the cylinder head. From the second milling operation, the piece goes into an idle station. This station is necessary to allow room for movement of the two traveling heads on either side. The last milling station has a 15 hp traveling head with one horizontal spindle that mills the right side (manifold face). Now with all four sides milled, the piece moves onto the unloading station and the outgoing conveyor. A safety switch at this station prevents another cycle of operation until the finished piece has been removed.



Sundstrand automatic transfer Rigidmil for milling cylinder heads

**NEW**

**Production  
and Plant**

**EQUIPMENT**

For additional information regarding any of these items, please use coupon on page 58

## B-81—Multiple Station Piston Gage

Nine critical dimensions of an automotive piston are checked simultaneously on this multiple station piston gage made by Pratt & Whitney, Division of Niles-Bement-Pond Co., West Hartford, Conn. Three Pratt & Whitney gaging



Pratt & Whitney multiple station piston gage

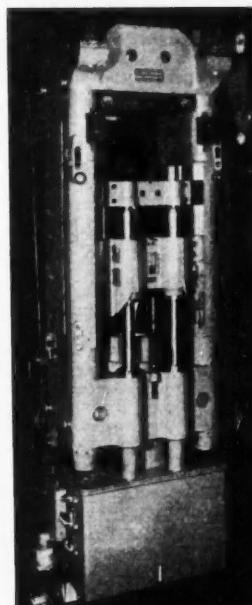
mediums (Air-O-Limit, Electrolimit, and Multiple Contact) combined into this one fixture, enable the gaging operations to be performed simultaneously.

The inspector simply places a piston on the automatic loading mechanism and watches the lights and meters on the instrument panel. The piston is drawn automatically into gaging posi-

tion and the nine dimensions are gaged simultaneously. Green lights indicate undersize, and red lights indicate oversize dimensions. The three meters show respectively the variation in pin-hole dia, skirt taper and skirt dia.

This gage checks 3 ring groove diameters, the top land dia, dome height, skirt taper, skirt dia, skirt squareness, and the pinhole dia.

## B-82—Double Action Hydraulic Press



H-P-M Co. 2000-ton double-action hydraulic press

A giant 2000-ton double-action hydraulic press, designed and built by the Hydraulic Press Mfg. Co., Mount Gilead, Ohio, will soon be turning out sheet metal stampings in France. The press is said to represent one of the largest all-hydraulic units ever built for export. It weighs 373,000 lb and when installed will tower 29 ft from floor level to the top of the press. A pit 10 ft deep will be required to install that part of the press normally located below the floor level. The press is capable of drawing sheet metal parts to a depth of 24 in. Dies up to 72 in. square can be installed in the press. In addition to the punch carrying slide, which has a capacity of 2000 tons, the press is equipped with a 600-ton hydraulic blankholder and a 400-ton hydraulic die cushion, the latter being located in the press bed.

The main slide is actuated by a double acting compound ram (with an internal booster ram) providing two selective forward areas for medium and

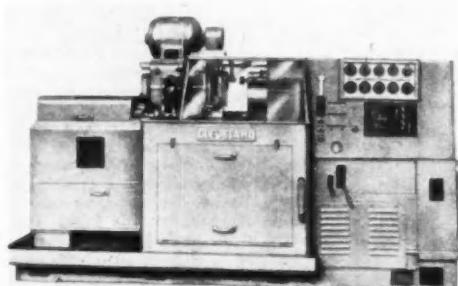
high pressure work, either in sequence through each cycle or independently. This H-P-M development doubles the pressing speed up to 1000-ton, then an automatic shift-over to the slower speed is made until the maximum desired pressure is reached, at which point the press automatically reverses. The feature is very beneficial when drawing parts which require only high pressure at the bottom of the stroke. Also on lighter draw work the higher speed pressing cycle can be used independently, making the press versatile for both light and heavy work.

A time-saving feature of the blankholder is that pressure can be adjusted independently at the four corners of the blankholder slide. This feature is extremely helpful when drawing irregular shaped parts where the blank must be held more firmly at certain points on the periphery of the blankholder draw ring.

The press operator is protected by a curtain-of-light safety control which involves use of the "electric eye" light beam which projects across the front of the press at the operator's working level. The press will not operate if the light beam is broken.

The press is equipped with a mechanical knockout in the main slide. Hydraulic power for press operation is generated by an H-P-M variable delivery, radial piston type hydraulic pump which has a displacement capacity of 185 gal of oil per minute at 2500 lb per sq in. This pump has reversible delivery which eliminates need for large size operating valves. The pump is directly driven through a flexible coupling by a 200 hp electric motor.

The press uses the H-P-M closed circuit FASTRAVERSE operating system which results in a high speed cycle with shockless reversal. An automatic slow-down prior to die contact with the metal blank to be drawn eliminates impact shock. Normally, hydraulic presses of this type produce drawn parts with less than 1 per cent scrap loss. Deep draws up to 50 per cent reduction in blank size are also possible. This results in fewer drawing operations on extremely deep parts. The only connections required to put the press in operation are electric power and cooling water.



Cleveland Dialmatic  
single spindle auto-  
matic screw machine,  
Model AB 2 1/2 in.

## NEW

### Production and Plant

## EQUIPMENT

*For additional information regarding any of these items, please use coupon on page 54*

### B-83—Automatic Screw Machine

Among refinements to the basic design of the new, Dialmatic Cleveland, Model AB 2 1/2 in. single spindle automatic screw machine manufactured by the Cleveland Automatic Machine Co., Cincinnati, Ohio, is re-design of the main guarding to permit easy access to the tooling, and to facilitate chip removal. The front panel in the main guard can be quickly lowered, forming a chute. Chips can be raked out of the pan directly into container for quick disposal. Extensive use of Plexiglas in the front and rear guards increases visibility in the tooling area. Plexiglas panels are hinged so that they can be easily raised out of the way of the operator or set-up man.

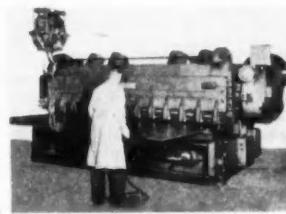
An electric feed drive makes independent and infinitely variable forward and return tool feeds possible, without cam changes, for each of the five tool positions in the tool turret. Forward and return feed settings are made by positioning 10 dialed rheostats on the control panel. Quick-disconnect plugs are now used to link all electric connections leading to and from the feed drive system. The plugs simplify removal of these nuts for inspection or maintenance.

Redesign of the electric control panel makes controls more accessible for maintenance and provides signal lights, two of which show direction of rotation of the spindle. Two other lights show

whether the spindle is in fast or slow drive. The remaining two lights indicate whether the machine is in feed or rapid traverse.

### B-84—Remote Control Foot Switch

A remote control electric foot switch attachment for use in large volume shearing of wide or long plates and sheets is available from the Cincinnati Shaper Co., Cincinnati, Ohio. Application of the remote control foot switch to a Cincinnati shear at any position convenient to a single operator eliminates need for an assistant operator



Cincinnati remote control electric foot switch attachment for Cincinnati shear

normally required to trip the conventional full-length mechanical treadle located along the front of the machine.

In shearing operations where it is advisable however to employ sometimes one and sometimes two operators this electric clutch control is also furnished having two foot switches and a selector for choice of single or double operator control. With double operator control a built-in safety feature to prevent accidents requires that both operators must operate their foot switches before the clutch will trip and the shear will function.

Photograph shows shearing of a 3 in. plate 12 ft wide by a single operator utilizing the remote control foot switch instead of the standard foot treadle.

### B-85—Two-Stage Brazing Machine

Three distinctly different gages of tubular aluminum are brazed, with only a 50-deg temperature differential between the flow-point of the brazing alloy and the burning-point of the components, at the rate of 500 assemblies per hr on a special-purpose automatic gas-fired machine produced by Selas Corp. of America, Phila., Pa. Claimed production rate is ten times the displaced hand-operation. The principle of this equipment can be applied to brazing operations that require exact control of temperature and oven.

The two-stage machine has sixteen soft-flame gas burners, each controlled

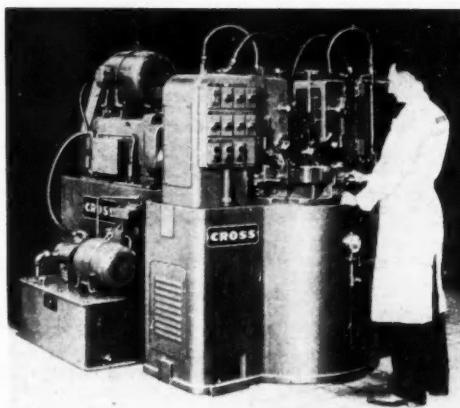
for heat input and placed to give the required brazing-heat patterns. Operator-comfort is accommodated in the first stage by water cooling. A variable speed control is synchronized with the time-heat requirements at the operations. Correct combustion mixture of gas and air is supplied at constant pressure to the brazing machine by a Selas combustion controller. The installation is equipped with fire checks.

### B-86—Machine for Boring Gear Pockets

A new special machine tool which for the first time automatically bores and

## NEW Production and Plant EQUIPMENT

*For additional information regarding any of these items, please use coupon on page 54*



Cross automatic special machine for boring and facing side gear pockets of differential cases

faces side gear pockets of differential cases has been announced by the Cross Company, Detroit, Mich. The unit was designed to produce 100 pieces per hr at 100 per cent efficiency for one of the big motor car manufacturers—a production rate said to be much larger than possible by previous methods.

The new machine is an automatic cycle unit. The operator merely loads and unloads the parts and presses the cycle button. One unskilled operator can easily handle two machines.

Flexibility for reasonable product design changes is provided through use of standard Cross units, permitting quick interchangeability and easy maintenance. Features include hydraulic feed and hardened and ground steel ways.

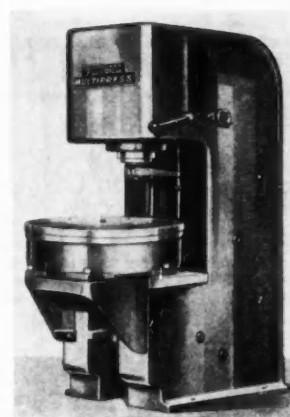
### B-87—Vernier Slide Gage



George Scherr Co.'s standard vernier slide gage

### B-88—Self-Contained Hydraulic Press

A 25-ton Multipress added to the line of the Denison Engineering Co., Columbus, Ohio, extends the range of standardized, self-contained oil-hydraulic presses in this line beyond the bench size 4, 6, 8 and 10-ton capacity units. The press has a 15 in. stroke, 25 in. daylight opening, and a 12 in. throat depth. Approach of the ram to the work can be preset at any speed up to 530 in. per minute. Uniform pressure application for every work cycle of the ram is obtained regardless of variations in dimensions of the parts being processed.



Denison 25-ton oil-hydraulic press

The George Scherr Co., Inc., New York, N. Y., announces a new measuring machine for external and internal measurements which is adaptable for use as a master check and for determining extremely accurate dimensions on pin gages, standard bars, and end measuring rods. Measurements are obtained between hardened steel anvils, and flat jaws may be substituted for round plugs if desired. For use in both measuring systems, the precision steel scale is graduated in in. as well as in mm. The machine comes in two sizes, No. 1 with a measuring range of 80 in. and No. 2 with a range of 120 in.

The slide carrying the vernier and measuring anvils is fitted with a fine adjustment screw. The large vernier is of the easy reading Chesterman type, 2,450 in. long, compared to the conventional vernier of only  $\frac{1}{16}$  in. It affords readings without use of magnifiers.

The press may be equipped with dual hand lever, single lever, foot pedal or electric pushbutton, as well as with automatic valve controls for single cycling, continuous cycling, or vibratory repeat strokes. Automatic ram cycling also may be used in conjunction with variable speed approach, adjustable pressures, and interlocking hydraulic accessories. Added advantages include inching control of the ram for quickly locating dies and tooling during set-up periods.

A large 33 in. dia revolving hydraulic index table, which may be installed as an accessory to move parts under the press ram automatically, provides indexing for either 6 or 12 stations. Provision is made for "skipping" non-tooled stations on this index table.

### B-89—Increased Capacity Swing Lathe

Logan Engineering Co., Chicago, Ill., now has in production a new 11 in. swing lathe of increased capacity over their 9 in. and 10 in. lathes, featuring 1 in. collet capacity for draw-in collets and center distances of 24 in. and 36 in.



Logan 11 in. swing lathe

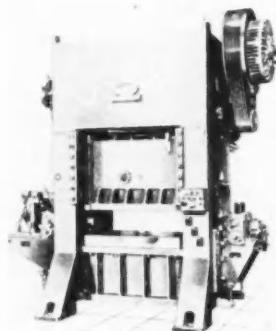
Overall construction is also heavier.

The Logan pre-loaded ball bearing spindle mounting is said to assure accuracy at all spindle speeds from 45 to 1500 rpm without bearing adjustment. Total spindle runout is held to within 0.0005 in. twelve inches from the bearing. The two V-ways and two flat ways of the heavier, more rugged bed are precision ground to a tolerance of 0.0005 in. along the lineal capacity of the lathe. Self-lubricating bronze bearings protect against wear at points where bearings are not ordinarily used.

Full quick change gear equipment provides instant selection of 48 threads and feeds. Models are available in cabinet, bench, and conventional floor types.

### B-90—Mechanical Stamping Press

A complete line of medium to high tonnage mechanical presses is offered by Danby Machine Specialties, Inc., Chicago, Ill., for stamping operations



Danby 75-ton high production press

employing standard, progressive, or multiple dies. Sizes and types include high production units having speeds to 250 strokes per minute with capacities

**NEW**

*Production  
and Plant*

**EQUIPMENT**

*For additional information please  
use coupon on page 54*

### B-91—Compressed Air Production Press

The Taber Instrument Corp., North Tonawanda, N. Y., is placing on the market a press powered by compressed



Taber production press, model 129

from 50 to 800 tons. The presses provide automatic feed of coil and strip stock and may be obtained with direct non-gearred, crank-drive; single reduction gear, eccentric drive; and double reduction gear, eccentric drive.

Press frame components, including base, uprights and crown are of heavy steel sections, welded and stress relieved. Bed is fabricated from steel plate. The unit is heavily ribbed to resist deflection under load and to reduce vibration. Bed, crown and uprights, precision machined, assembled, and keyed in alignment are locked into an integral unit with high carbon steel tie rods.

A new type floating friction block clutch transfers 85 per cent of flywheel momentum to the drive shaft upon engagement. Most of the clutch parts rotate with the flywheel at all times and add to its momentum, greatly reducing clutch wear. The clutch is a fan-cooled, air-operated unit mounted externally. The clutch is activated by an electric solenoid controlled through a conveniently located push button station. Safety is provided by interlocking circuits, inching, non-repeat and variable speed controls.

The brake is released by an air cylinder which automatically opens the brake when the clutch is engaged. Press cycle is stopped by closing the air cylinder which permits spring pressure to be applied against the brake shoe. This pressure is constant, and should there be an air or power line failure, the brake is automatically spring set.

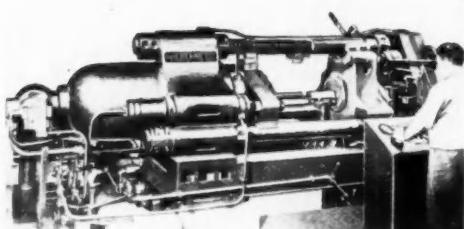
air with hydraulically controlled ram movement having precise electronic timing features to provide adjustable preset rates of movement in closing the die or performing an operation.

This model 129 press is adaptable for drawing, forming and assembly operations where a variety of conditions are encountered. For instance, an assembly operation may require a fast traverse of the tool attached to the ram to a point 1/16 in. above an operation, then a slow powerful stroke up to 2 tons pressure to perform the operation.

The pressure of the ram is adjustable from 100 lb to 2 tons. Rate of ram travel is adjustable by valve manipulation from 1000 in. per minute down to 10 in. or less per minute. The electronic control panel provides for one or more stop periods of varying duration.

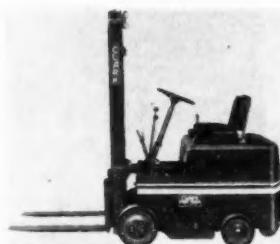
### B-92—Oil-Hydraulic Extrusion Press

*A production rate of 50 to 60 billets per hr is claimed for this oil-hydraulic horizontal extrusion press designed by Hydropress, Inc., New York, N. Y. It is a self-contained machine built in 500 and 1000 tons capacity for rapid production of rods and shapes from light metals and other non-ferrous alloys.*



## C-95—Re-designed Fork Truck

Redesigned gas - powered "Clipper" model 2000-lb capacity fork-lift truck of the Clark Equipment Co., Industrial Truck Division, Battle Creek, Mich., combines greater capacity with compactness. Features consist of load center placed at 24 in. from the heel of the forks and a longer wheelbase of 36 in. Frame has been widened slightly to provide greater wheel protection and more space for servicing, although overall width is but one inch larger. Additional weight now put on the drive wheels provides increased traction. Grades of 15 per cent are now climbed without difficulty, it is claimed.



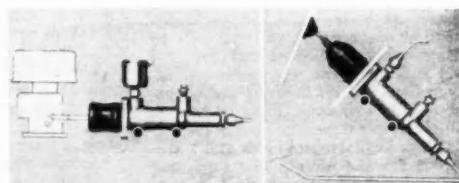
Clark 2000-lb capacity "Clipper" fork lift truck

Mechanical improvements include a new engine of 30 per cent higher brake hp and increased torque; a new and improved oil sump and valve for operating hydraulic equipment; and greater strength and stability in the frame-steering-axle-engine assembly. Floor board is slanted for easier driving. A leather-upholstered air-inflated seat is provided with comfortable back rest.

## C-96—Brake Lining Adhesive

In place of rivets, for attaching brake linings to brake shoes a new "super-adhesive" synthetic material, Plastilock 601, has been developed by B. F. Goodrich Co., Akron, Ohio, in conjunction with a major automobile company. Used on the latter company's trucks for the past 18 months and on its passenger cars since introduction of its 1949 models, the adhesive is claimed to have greater shear resistance than rivet fastening.

(Left) The slave cylinder. (Right) The master cylinder of the Bendix hydraulically actuated remote throttle control for rear engine vehicles.



NEW



PRODUCTS

For additional information please  
use coupon on page 54

Withstanding a "pull" of 11,000 lb per brake shoe compared to 5000 lb for rivets, the brake lining can be worn practically down to the shoe when adhesive-attached, compared to only approximately half way if rivet-attached. Absence of rivets additionally eliminates possibility of scoring the brake drum, the manufacturer states.

## C-97—Hydraulic Throttle Control

Bendix Products Division, Bendix Aviation Corp., South Bend, Ind., announces a self-contained hydraulic control system for throttle valve operation on rear engine vehicles.

The system consists of three principal units—a reservoir, a treadle operated master cylinder and a slave cylinder connected by a single or a double hydraulic line according to installation requirements. The slave cylinder operates the carburetor throttle valve in response to the movement of the master cylinder piston.

The new design, utilizing die castings for the main bodies has been put into production to meet the increasing demand for the hydraulic throttle control, according to Bendix officials.

By displacing less fluid at a higher line pressure it permits a lower flow velocity for the same rate of throttle opening, ultimately resulting in greater efficiency with considerably less treadle pressure.

Advantages claimed are the elimination of rods, levers, shafts, bell-cranks, bearing support brackets, etc., which may be affected by dust, dirt, freezing temperatures, misalignment because of chassis weave, or flexible engine mounts and complicated installations.

The Bendix throttle control is said to eliminate use of all mechanical linkage from the driver's compartment back to the engine.

## C-98—Scrap Disposal Dump Truck

Three-ton "waste-basket" that rolls on a spring-mounted chassis and is hinged at the bottom to permit the lowering of the side for dumping has been brought out by Service Caster & Truck Corp., Albion, Mich., and Somerville, Mass. Named the Service Trash-Truk, for use in scrap disposal at a major automobile plant, it is available in a number of variations of chassis and running gear. Outside dimensions



Service Trash-Truk for scrap disposal

are 10 ft by 4 ft by 42 in. deep. Running gear is 18 in. by 5 in. pressed-on rubber tired wheels.

## C-99—Electronic Spark Protractor

An electronic spark protractor that accurately and continuously measures the average spark advance of 6 and 8-cylinder engines is announced by Photocon Research Products, Pasadena, Calif. The instrument is useful for determining fuel octane requirements



Photocon electronic spark protractor

of new high-compression engines under road load conditions.

The protractor's dial has 250 deg of arc, scaled to record from 10 deg retard to 60 deg advance. Accurate to plus or minus  $\frac{1}{2}$  deg, each instrument is individually calibrated. According to Photocon, it operates directly for 6-volt battery, yet measurements are unaffected by engine speed or battery voltage. It is also furnished in combina-

tion with an accurate, individually-calibrated tachometer for measuring engine rpm. An instrument for measuring the average spark advance of each individual cylinder is also available.

### C-100—Copper Oxide Battery Charger

Westinghouse offers a Rectox copper oxide battery charger, for "on-the-spot" charging of industrial truck batteries in warehouses, freight terminals, piers, docks and industrial plants.

The charger features the saturable reactor control as an improvement over



Westinghouse Rectox copper oxide battery charger

the finish rate resistor. This reactor provides smooth adjustment at output by variation of inductance. Use of a rheostat control, adjustable while energized, eliminates constant changing of taps for high rate, low rate, aging and line voltage variation. Charging cycle is completely automatic, after preliminary selection of the rate by the turn of a dial.

The Rectox charger can be obtained as a combination unit to charge either lead-acid or nickel-alkaline batteries. Either type battery can be fully charged in less than eight hours, the company reports. Addition of a "plugs-in" charge control panel affords simple change from a nickel alkaline charger to a lead-acid charger. The charger is designed for either 230 to 460 volts.

### C-101—Heavy Duty Filament Tape

A second "Scotch" brand filament tape for heavy duty packaging is made available by Minnesota Mining and Mfg. Co., St. Paul, Minn.

NEW

★  
PRODUCTS

For additional information please use coupon on page 54

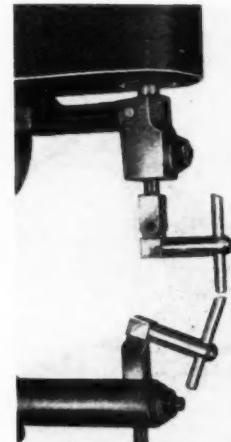
### C-102—Bench Type Electrode Holder

P. R. Mallory & Co., Inc., Indianapolis, Ind., is placing on the market a bench-type welding electrode holder offering complete versatility in adjustment, using standard packaged electrodes. The holder is designed to save set-up time and eliminate need for bending and machining special tips.

The holder has a full 180 deg range of head adjustment with positive locking in any position under full operating pressures. Heads are available for 30 deg or 90 deg electrode angle and the electrodes have positive, non-slip adjustment in the holder head over their

Designed with an acetate film backing instead of paper, the new tape is waterproof, and is thinner than the paper-backed filament tape, making it easier to handle and enabling packages banded with it to slide freely. Caliper of the acetate film tape is 7.9 mils as compared with 13-15 mils for the paper backed tape announced Jan. 1 by the same mfr. Both tapes have tensile strength of 180 lb per in. of width, and a tear resistance greater than the 1600 gram-centimeters that can be measured on the ASTM-approved Elmendorf tear tester.

Toughness, it was announced, is due to a new type of tape construction in which thousands of long threadlike filaments reinforce the backing, as steel rods reinforce concrete. The filaments—more than 5,000 per in. of tape width—are continuous elements of high



Mallory bench-type welding electrode holder



Heavy duty "Scotch" brand filament tape of the Minnesota Mining and Mfg. Co.

strength rayon fibre similar to the type being used to impart extra strength and shock resistance to auto tires. The filaments run lengthwise with the tape, parallel to each other, and are permanently imbedded in a resilient, shock-proof rubber adhesive, it is disclosed.

The tape needs no application equipment. It is designed for packaging metal pipes, rods, sheets and coils by being wrapped once around the load and back on itself. Its pressure-sensitive adhesive grips immediately on contact. It is also expected to be used in palletizing operations.

Colors available are black and transparent for the acetate film tape, and tan-white for the paper-backed product.

entire length of 1½ in. Because each electrode has a 90 deg and 30 deg welding face, in combination with 90 deg and 30 deg holder heads, a variety of positions is possible.

The holders eliminate handling of rod stock for making up special electrodes. Electrodes are available in Elkaloy A and Mallory 3 metal, and are packed in 1/16 in., 1/8 in. and 3/16 in. dia.

### C-103—Improved Lapping Compound

Timecutter, a three-way improved lapping compound, produced by Timessaver Products Co., Seattle, Wash., is said to cut hardened steel in remarkably fast time, the secret residing in the vehicle that carries the silicon carbide. That is to say, the oil base holds the abrasive grains at points of contact where they are meant to grind, rather than to permit them to roll or squirt away. Timecutter is packed in 10 different grits ranging from very coarse to microscopic fine.

(Turn to page 56, please)

# PERSONALS

Recent Personnel Changes and Appointments at the Plants of the Automotive and Aviation Manufacturers and Their Suppliers.

**Chrysler Corp., Export Div.**—George B. Fraumann has been appointed Parts Sales Manager of the division. At the same time the appointment of T. H. Bullard as Asst. Service Manager of the division was announced. C. C. Stewart has been made Parts Operations Manager.

**The Autocar Co.**—The appointment of Walter M. Taylor as Sales Manager has been announced. Mr. Taylor succeeds E. F. Coogan who, recently, was elected president of the company.

**E. I. duPont deNemours & Co., Inc.**—The Technical Div. of the Electrochemical Dept. has announced the following changes in personnel: Dr. Paul R. Austin has been made Director; Dr. Harold J. Barrett, Chemical Research Manager at Niagara Falls, has been named Manager of Field Research with headquarters in Niagara Falls; Dr. Campbell Robertson has been made Chemical Research Manager at the Niagara Falls plant. The appointments are effective May 1.

**Ford Motor Co.**—Logan C. Miller has been appointed General Manager of the newly named Rouge Division.

**The Ohio Crankshaft Co.**—The appointment of Tinkham Veale, II, to the post of Assistant to the President has been announced.

**Spicer Mfg. Div., Dana Corp.**—The following promotions have been announced: D. D. Robertson to the position of Sales Manager; Willis L. Stone, Assistant Sales Manager.

**The Dow Chemical Co.**—Changes in the executive staff of the company have been announced as follows: Earl W. Bennett, Treasurer, has been elected Chairman of the Board. Leland I. Dean was elected President of the company. Dr. Mark E. Putnam, a Vice-President, has been named General Manager. Two new Vice-Presidents were announced. Dr. A. P. Beutel, General Manager of Dow's Texas Div., and Russell L. Curtis, General Manager of the Great Western Div. Carl A. Gerstacker was elected Treasurer, and Calvin A. Campbell, the company's legal counsel, was elected Secretary.

**Stewart-Warner Corp.**—W. E. Judd has been appointed General Sales Manager of the South Wind heating equipment division. He succeeds S. E. Heymann, who becomes South Wind branch manager at Los Angeles.

**Loewy Construction Co., Inc., Rolling Mill Div. of Hydropress, Inc.**—Philip Finale has been made Chief Engineer.

**Keller Motors Corp.**—The announcement of George D. Keller as Vice-Presi-

dent in charge of production has been made.

**The B. F. Goodrich Co.**—Glenn E. Martin has been named Advertising Manager of the Replacement Tire Sales Div. of the Company.

**The Budd Co.**—Donald Alexander has announced his resignation as Vice-President of the Company. Mr. Alexander plans to retire from active busi-

ness but will continue as a member of the Board of Directors.

**Gemmer Manufacturing Co.**—H. M. Denyes, formerly Sales Engineer, has been made Sales Manager.

**The Glenn L. Martin Co.**—Announcement has been made of the election of two new directors—Maple T. Harl, of Washington, D. C., and Everett H. Pixley, Pittsburgh, Pa.

**The General Tire & Rubber Co.**—The election of John O'Neill, Treasurer, as a member of the Board of Directors has been announced. Mr. O'Neill fills the vacancy created by the resignation of (Turn to page 80, please)

## PRODUCTION OF GERMAN AUTOMOTIVE INDUSTRIES IN THE POST-WAR YEARS.

Tabulated by Gunther Papenbrock, M.S.A.E., Hamburg, Germany

CARS	MAKE	MODEL	PAYLOAD (Seats or Power)	1945 1946 1947 1948			
				1945	1946	1947	1948
Daimler-Benz		170 V	5 seater			381	4204
Ford		Taunus	5 seater			182	
Opel (GMC)		Olympia	5 seater			20	5782
Opel (GMC)		Kapitan	5 seater			256	
Volkswagen		11	4 seater	66	9931	940	19127
			Total	66	9931	9341	28841
<b>TRUCKS</b>							
Borgward		B 1000	1 ton			4	2022
Borgward		B 3000	3 ton			1164	679
Büssing-NAG		B 7000 S	7 ton	1032	1507	908	1411
Daimler-Benz		170 V	0.75 ton			214	884
Daimler-Benz (Opel)		701-3, 6-38 S	3 ton	747	1497	2001	3605
Daimler-Benz		L 5000 S	5 ton	290	522	405	884
Faun		M 6	4 ton			22	67
Faun		M 10	4.5 ton			7	31
Ford		V-8 Cyl.	3 ton	2438	4649	2600	1881
Ford		Taunus	0.5 ton				3248
Motostandard-Guthrod		S 04	0.75 ton				144
Kaelble		S 6 GN 125	6 ton	6	28	19	36
Klockner-Magirus		S 3000	3 ton			481	462
M. A. N.		M 1K	5 ton	1	311	617	725
Opel (GMC)		2.5-45	1.5 ton			832	3219
Sudwerke-Krupp		A 40	0.75 ton			175	404
Vidal-Tempo		A 400	0.5 ton	796	1665	1098	3768
Volkswagen		81	Total	2433			
			Total	7743	13272	13403	29238
<b>MOTOR-BUSES</b>							
Büssing-NAG		5000 T	53 seater	37	175	230	324
Daimler-Benz		O 5000	38 seater				62
Ford		V-8 Cyl.	33 seater				178
Klockner-Magirus		O 3000	33 seater				112
Krause-Maffei		KMO 130	50 seater	57	96	181	9
M. A. N.		MKN	39 seater				
			Total	37	232	326	883
<b>TROLLEY-COACHES</b>							
Henschel		Obus II	50 seater			12	85
Krause-Maffei		KME 130	50 seater			7	
M. A. N.		KME	50 seater			1	
			Total	12	85	98	
<b>TRACTORS</b>							
Deutz-Wag		D/DA 28	28 Hp				116
Faun		L 7 Z	150 Hp				3
Hanomag		RL ST 20	20 Hp		3	150	631
Hanomag		R 40	40 Hp	847	1374	967	1373
Hanomag		R 50	50 Hp				7
Hanomag		ST 100	100 Hp	154	305	138	234
International (IHC)		FG FS	20 Hp		92	202	320
Kaelble		Z 5 R 2 A 130	130 Hp	6	8	0	4
Klockner-Deutz		F 1 M 414	11 Hp		61	381	1538
Klockner-Deutz		F 3 M 417	50 Hp		118	14	510
Lanz		D 7508	25 Hp				23
Lanz		D 7511	25 Hp				116
Normag		NG 23	24 Hp		71	3233	707
Primus		P 24	24 Hp				14
Ritter		N 24	24 Hp		77		
Ritter		320	24 Hp				87
			Total	807	2129	2182	6662
			Grand Total	9653	25576	25337	68386

## PUBLICATIONS AVAILABLE

Publications listed in this department are obtainable by subscribers through the Editorial Department of AUTOMOTIVE INDUSTRIES. In making requests please be sure to give the NUMBER of the item concerning the publication desired, your name and address, company connection and title.

### A-128—High Nickel Alloys

The International Nickel Co., Inc.—A new technical bulletin on resistance of high nickel alloys to corrosion by sulfuric acid is available. Performance of over 30 different nickel-bearing materials in a wide range of services is discussed. The bulletin contains many tables, graphs and photographs in addition to text matter. Problems involving such a wide range of operations from the pickling of steel to petroleum refining and textile processing are discussed. The bulletin is designated as Technical Bulletin T-3.

### L-129—Flexible Metal Hose

Chicago Metal Hose Corp.—A new, colorfully illustrated catalog, G-50, has been issued by the company. The 68-page booklet contains full description and complete specifications for standard types of flexible metal hose, in a variety of metals. In addition it contains sections on expansion joints for piping systems; stainless steel and brass bellows and various conduits and special assemblies of these components.

### L-130—Hand Tapping Machine

The Producto Machine Co.—A new bulletin pictures and describes the heavy duty Universal Hand Tapping machine. Features of the machine and specifications are included in the bulletin.

### L-131—Reversible Plug Gages

Pratt & Whitney—The cylindrical and thread type reversible plug gages are described and illustrated in a new two-color folder. A page is devoted to illustrating the various parts of both gages and includes a specifications table for each type.

### L-132—Characteristics of Revere Metals

Revere Copper & Brass, Inc.—Fundamental Characteristics of Revere Metals is the title of a new 63-page booklet, in non-technical language, which gives the basic technology of copper, brass and bronze. Topics covered are copper and its alloys; cold working and hardness; annealing, corrosion and specifications.

### L-133—Tool Manual

Carboly, Inc.—A new, 190-page tool manual, No. GT-191, answers many questions concerning single point carbide tools—how to design them, make them, use them, grind them, etc. The manual is divided into ten sections. Each section thoroughly covers the latest approved recommendations on the following subjects: tool design; chip breaker design; grade and speed selection; brazing; tool grinding; chip breaker grinding; application of tools; trouble shooting; inspection of tools and tool control and method selection. The manual is available without charge to supervisory personnel.

### L-134—Radial Saws

Walker-Turner Div., Kearney & Trecker Corp.—Folder 1009 describing the new Center-Pivot Radial Saw, for wood, plastic and metal, includes action and feature photographs, model listing, accessories and prices. Also shown are standard components which are available for setting up high speed production line cutting.

### L-135—Automatic Oilers

Trico Fuse Mfg. Co.—A new, profusely illustrated book shows actual job installations of visible, automatic oilers and provides many helpful tips on correct oiler application. Oiler types illustrated include constant level, wick, thermal and gravity feed.

### L-136—Aircraft Steels

Joseph T. Ryerson & Son, Inc.—A new, 64-page booklet contains descrip-

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Down time is costly. Earth-moving equipment, tractors and other heavy machinery need bolts that can resist extremely severe stress, shear and impact without wear or breakage.

"National" makes special bolts for such rugged service from high carbon or alloy steel, specially heat-treated.

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"National" Products Include

HODELL CHAINS . . . CHESTER HOISTS

## Publications Available

(Continued from page 54)

tions and lists sizes, weights, lengths and extras of carbon, alloy and stainless grades of aircraft quality steel available. Included is a condensed listing of AN-QQ, Federal QQ, and AN and AMS Specifications pertaining to steel.

### L-137—Air Chucks

The Cushman Chuck Co.—Announcement has been made of a new bulletin detailing operation and adjustment of air chucks with the Accralock individual precision jaw adjustment feature.

### L-138—Filtering Oils

Honan-Crane Corp.—A set of four 2-color booklets recently released gives the complete story on the value of filtering oils and coolants used in metal working operations such as cutting, grinding, boring, honing, quenching, etc. The booklets discuss: 1) Dollar savings in man hours, lower operating costs and higher production. 2) How to solve problems of dermatitis, excessive rejects, coolant disposal, machine downtime. 3) The right method and equipment to handle problems from 1 to 500 machine tools.

### L-139—Cord Conveyor Belts

The B. F. Goodrich Co.—A new 6-page catalog section on its lines of conveyor belting has been issued. It fully describes construction of the Cord belt. The catalog section also pictures and describes other conveyor belts in the company's line, including several for specialized services.

### L-140—Sharpening Cast Alloy Cutting Tools

Norton Company—The March, 1949 issue of Grits and Grinds, Company house organ, contains a comprehensive article on sharpening cast alloy cutting tools. Another article on cam and shape grinding is contained in the same issue. Both articles are illustrated.

### L-141—Powdered Metal

Powdered Metal Products Corp.—Powdered Metal in Your Production Picture is the title of a new 8-page booklet which introduces a broad range of new applications for powdered metal fabrication processes. A table of physical properties is included.

### L-142—Blowers—Exhausters

Lamson Corp.—Bulletin B-5-A describes and illustrates the company's centrifugal type blowers and exhausters. Typical applications, capacities

and general specifications are included. Another folder just made available by the Lamson Corp. is one of conveyors, dispatch tubes, etc.

### L-143—Wrenches

The Billings & Spencer Co.—Up-to-date information on the company's complete line of Vitalloy wrenches and shop tools is contained in a new 100-page catalog, No. 49. It features easily read type, large illustrations, and a handy alphabetical index at front and back sections. A section is devoted to a description of the progressive steps in the production of wrenches.

### L-144—Milling and Centering Machines

Davis & Thompson Co.—The Roto-Matic milling and centering machines are featured in bulletin No. 170, just issued. The exclusive chain clamping feature of the Roto-Matic line is illustrated and described.

### L-145—Metal Stampings

The City Auto Stamping Co.—An illustrated brochure, Metal Stampings, in observance of its 20th anniversary, has been published by the Company. The brochure depicts, photographically, the modern plant equipment and capacity for production of large and complicated parts used by manufacturers in the automotive field, farm tractors and equipment, etc.

## NEW PRODUCTS

(Continued from page 52)

### C-104—Ductile Cast Iron

A new engineering material described as ductile cast iron, which combines the process advantages of gray cast iron, such as fluidity, castability and machinability, with the product advantages of cast steel, has been developed in the Research Laboratories of the Development and Research Division of the International Nickel Co., Inc., New York, N. Y. Closing the gap between cast iron and cast steel, this material is characterized by a graphite structure in the form of spheroids, free from graphite in the flake form. Its excellent physical properties, particularly high elastic modulus, high yield strength and ductility, are said to suggest suitability for many applications hitherto considered beyond the scope of cast iron.

Production of this iron can be applied to common cast iron compositions melted in the cupola or in other kinds of furnaces, and is based on introduction into the iron of a small but effective amount of magnesium or a magnesium-containing additive agent, such as nickel-magnesium alloy.

For pearlitic grades of cupola-melted material containing 3.2 to 3.6 per cent carbon and 1.8 to 2.8 per cent silicon, the ductile iron provides, in the as-cast condition, a combination of 85/105,000 psi tensile strength, with some ductility. In contrast to gray cast iron, strength is only moderately affected by section thickness. Under stress it is said to behave elastically like cast steel rather than cast iron, having proportionality of strain to stress up to high loads, with a modulus of elasticity of 25 million psi.

Although the metal magnesium has been considered by metallurgists as completely unalloyable with iron, if properly controlled it can be effective-

ly incorporated in molten iron to bring about changes, one result of which is the formation of graphite wholly in the form of spheroids. One effective way of doing this is by incorporating a nickel-magnesium alloy in the molten iron. Operative with practically all the basic types of cast iron including hypo- and hypereutectic, ferritic, pearlitic, acicular and austenitic varieties, it is reported that this new process can be applied without difficulty in well-run foundries.

Potential application for ductile cast iron in the automotive industries, both as-cast and heat treated in component parts, appears numerous, as well as in machine tools, crankshafts, pumps, compressors, valves and heavy industrial equipment. Its ductility may provide thermal shock resistance far greater than has been available in high carbon castings heretofore, it is claimed. Its resistance to growth and oxidation is said to give promise of use in engine, furnace and other parts used at elevated temperatures.

### European Recovery

(Continued from page 39)

the first year are only now being assembled.

Western Europe's trucking fleets have grown rapidly since the war and most countries now have trucks equal to or exceeding prewar totals. But these fleets are rapidly wearing out and soon will need replacing. As a result, ECA is allotting a minimum of \$40 million for this purpose next year.

France will contribute heavily to Europe's motor transport expansion as a result of soaring production. Last year, French output was estimated at 177,300 vehicles, about 2½ times the 1947 production figure of 71,100. American-made trucks will make up most of the remainder.



Franks Truck-Mounted Rotary Drilling Rig on Oshkosh Chassis (with dual front wheels and four-wheel drive) uses Vickers Hydraulic Power Steering for easy and **SAFE STEERING**.

VICKERS HYDRAULIC POWER STEERING IS Effortless, Positive, Shockless.



Vickers Hydraulic Steering Booster with Integral Overload Relief Valve. Bulletin 47-30a.

Vickers Balanced Vane Type Pump is Engine Driven. Bulletins 36-12 and 49-52.

**VICKERS Incorporated**

DIVISION OF THE SPERRY CORPORATION

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**HEAVIER FRONT-WHEEL LOADING**

**VICKERS**

*Hydraulic*

**POWER STEERING**

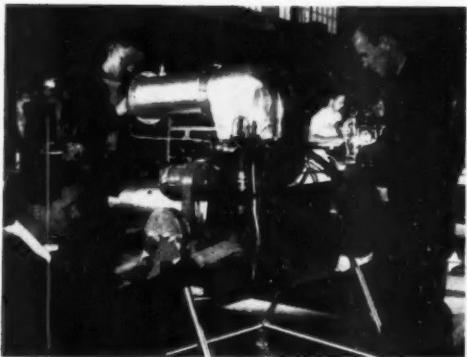
With ordinary steering, front-wheel loading is sharply limited by what the driver can pull and by acceptable steering gear ratios. But with Vickers Hydraulic Power Steering, the driver doesn't have to pull . . . hydraulic power does the work. Front-wheel loading can be any amount the chassis can take. No matter how much it is, the steering is effortless and safe. The Vickers Hydraulic Booster puts no load on the steering gear. The steering force reaction is absorbed by the frame . . . so front-wheel loading does not affect the steering gear. Write for Bulletin 47-30a for the many other advantages of Vickers Hydraulic Power Steering.

3822

ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

# NEWS of the AUTOMOTIVE INDUSTRIES

(Continued from page 23)



## JET LIGHTWEIGHT

Using a surplus turbo-supercharger, installed originally in a World War II fighter, this new lightweight turbojet engine has been developed by students of the Northrop Aeronautical Institute, Hawthorne, Calif. Featuring a reverse flow combustion chamber and all-electric controls, the engine develops 200 lb of thrust, and weighs about 180 lb.

Ont., Canada. Built adjacent to the present passenger car and engine manufacturing plants, to facilitate inter-plant and office communications, the two-story E-shaped structure has 86,946 sq ft of floor space.

## Ford of Canada '48 Net Tops \$7.9 Million

The Ford Motor Co. of Canada, Ltd., has reported a net profit of \$7,969,535 for 1948, compared with a net of \$5,996,003 for the preceding year.

## Perfect Circle Again Sponsors Indianapolis Race Broadcast

As in the past three years, the Perfect Circle Corp. will dedicate their coast-to-coast broadcast of the Indianapolis Race to "Doctor of Motors," the vast army of American mechanics throughout the country who keep our cars and trucks running smoothly along our highways as well as on the race track.

## Ashok Motors In India to Make Austins

With an initial production capacity of 100 Austin cars and trucks a week, an assembly plant will be completed at Ennore, 9 mi from Madras, India, by Ashok Motors Ltd. Ashok is now the sole importer of Austin products for India.

## Chrysler Appoints Dungan New Castle Plant Mgr.

R. H. Dungan has been appointed factory manager of the New Castle, Ind., plant operated by the Chrysler Corp. He succeeds W. G. Helber who has retired.

## Must Pay Full Duty on Foreign Articles with U. S. Parts

The Treasury Dept.'s Bureau of Customs has ruled that an article whose "physical entirety is assembled abroad in whole or in part with American parts," is dutiable on its full value. The decision deals specifically with a question concerning imported automobiles made in a foreign country by assembly of a complete body of United States or foreign manufacture and a complete chassis of U. S. manufacture. However, the determination is applicable to other types of merchandise assembled in entirety abroad where U. S. made parts are used.

## Plymouth to Sponsor Model Plane Contest

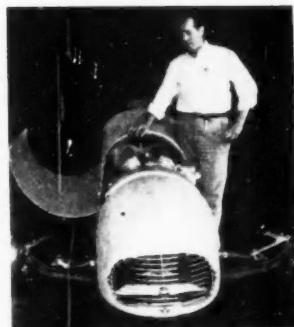
Chrysler's Plymouth Motor Corp. will sponsor the Third International Model Plane contest at Detroit from August 22 to 29. There will be 167 trophies and \$8750 in U. S. Savings Bonds for the winners.

## Japan Produced Over 21,000 Cars and Trucks in 1948

Although the tire shortage was a major factor limiting automobile output in Japan, a total of 21,174 cars and trucks were made in 1948; small passenger cars, 378; standard trucks, 15,829; small trucks, 3562; and electric cars and trucks, 1405. Constituting the Automotive Industrial Association, there are five independent automobile companies producing in Japan: the Nissan Industrial Corp., which produced 5892 Nissan trucks and 246 Datsun passenger cars in 1948; the Toyota Motor Co., Ltd., 6015 Toyota trucks and 18 Toyopet passenger cars in 1948; Mitsubishi Heavy Industries, Ltd., 859 Fuso trucks in 1948; the Kohsoku Engineering Co., Ltd., 114 Ohta passenger cars in 1948; and the Isuzu Motor Co., Ltd., 3063 Isuzu trucks in 1948.

## Government Polls Industry on "Single Service" Buying

The National Munitions Board is reported to be sounding out car and truck manufacturers on a "single service procurement" program for motor vehicles. Currently, Ordnance does the actual procurement but there are specific problems involved that are still handled by individual agencies getting the vehicles.



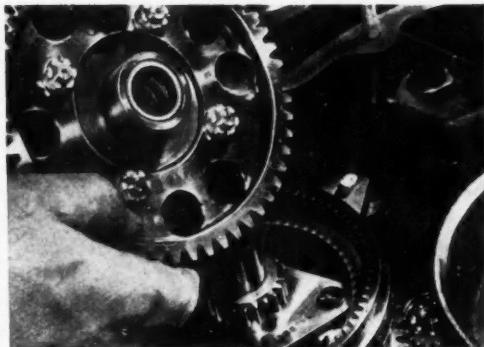
## LIGHT AND SIMPLE

The new Bowes Seal Fast Special, shown here with Pete Clark, designer and chief engineer, has a channel frame chassis with box cross members, and is said to have about the lowest center of gravity of any present day rear drive car. Front suspension is a transverse spring, and the rear is torsion bar. The engine is an unsupercharged 300-hp 270-cu in. Offenhauser. Built primarily for simplicity and lightness, this car is one of the lightest four-cyl rear drive cars today, weighing about 1600 lbs. The distance from the ground to the top of the headrest is 41 in. The frame runs under the axle, and shock absorbers are mounted inside the frame, eliminating any protruding parts. The car differs from the Bowes entry of 1948, which is running again this year, in that the older car is an eight-cyl in-line supercharged engine, built primarily for the Indianapolis race. The new car is designed for both Indianapolis and the dirt tracks. The older Bowes entry has a 450-hp supercharged engine. This is the first time Bowes has entered two cars in the same Indianapolis race. The new Seal Fast Special will be driven by Kenny Eaton, New Castle, Ind. It was built by Dietl & Lesovsky. See page 24 for special article on the Indianapolis race.

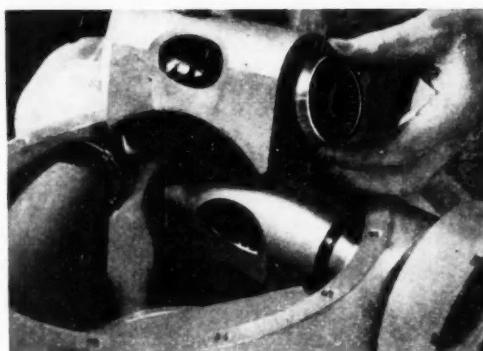
# Torrington Needle Bearings provide compact, rugged design for Curtiss-Wright B-36 propellers



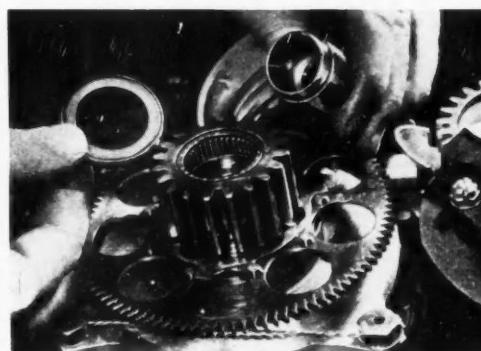
**Space is at a premium** in the pitch control mechanism of the Curtiss-Wright C636S propellers used on the B-36. Essential, too, are lightweight design and rugged construction. Torrington Needle Bearings are used in this mechanism because they provide exceptional compactness and load capacity.



**Rotating continuously at 1600 rpm**, the drive gear assembly operates efficiently on high-capacity Needle Bearings. During pitch change, each bearing carries radial loads of nearly 400 pounds. The full complement of rollers provides a high factor of reliability and assures long service life.



**Three large worm gear shafts** are mounted on Needle Bearings, and housings are kept relatively small. Stationary during fixed pitch operation, these gears need the high static non-brinell capacity of Needle Bearings—plus their smooth anti-friction operation at 1200 rpm during blade feathering.



**Lubrication is no problem** with Needle Bearings. Take this braking assembly as an example. The lips of the bearing ride close to the shaft and help conserve lubricant. The Needle Thrust Bearing, at the left, is specially designed for this application to provide compactness and high thrust capacity.

To secure the benefits of anti-friction operation at minimum cost in your designs, use Torrington Needle Bearings. Let our engineers help you with any related design or installation problems. Write us today. THE TORRINGTON COMPANY, Torrington, Conn., or South Bend 21, Ind. District offices in principal cities.



## **TORRINGTON NEEDLE BEARINGS**

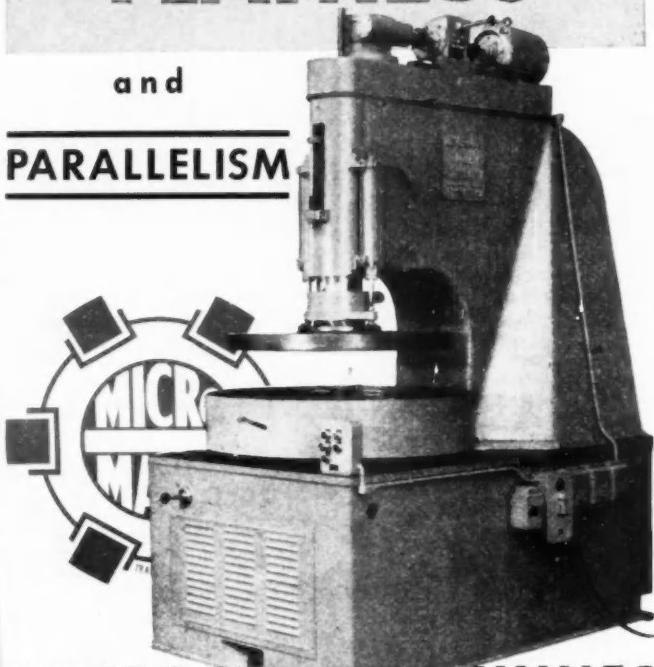
Needle • Spherical Roller • Tapered Roller

Straight Roller • Ball • Needle Rollers

# Productively Generate SURFACE FLATNESS

and

**PARALLELISM**



## MICROFLAT MACHINES



24 sets—48 parts—of these hardened Geroator pump gears are finished simultaneously on a Model 844-2 MICROFLAT machine. The surface is optically flat and parallel within 0.0001 inches. Production is approximately 1200 parts per hour.

Double Surface MICROFLAT machines provide a high production method of generating parallelism between two opposite faces of a part, in one operation. This is accomplished by mounting a number of parts in fixtures which rotate about their own centers while turning around a pivot gear. Lapping plates, above and below the fixtures, revolve in opposite directions about the common center. This assures that every point on each surface will be abraded by the full area of the plate. Loose abrasive is automatically applied to the plates. The operation of these machines is simple and the results are consistently accurate.

### MICROMATIC HONE CORPORATION

8100 SCHOOLCRAFT AVENUE, DETROIT 4, MICHIGAN

1323 S. Santa Fe  
Los Angeles 21  
California

616 Empire Bldg.  
206 S. Morris St.  
Rockford, Ill.

DISTRICT FIELD OFFICES:  
55 George St.  
Brantford, Ont.  
Canada

Micromold Manufacturing Div.  
Boston Post Road  
Guilford, Conn.



### Business in Brief

Written by the Guaranty Trust Co.,  
New York, Exclusively for AUTO-  
MOTIVE INDUSTRIES.

Business activity in general increased moderately during the week ended April 9. Department store sales, railway freight loadings and bituminous coal production were higher than in the preceding week, while electric power production, crude oil output and construction declined. The *New York Times* index of activity for the week ended April 9 stands at 146.7, as compared with 145.6 in the preceding week and 142.6 a year ago.

Sales of department stores during the week ended April 9, as reported by the Federal Reserve Board, equaled 298 per cent of the 1935-39 average, as compared with 280 in the week before. Sales were seven per cent above the corresponding distribution a year ago, the same percentage variation as that registered in the preceding week. The total in 1949 so far reported is four per cent less than the comparable sum in 1948.

Electric power production continued to decline during the week ended April 9. The output was 6.5 per cent above the corresponding amount in 1948, as compared with a similar advance of 6.8 per cent shown for the preceding week.

Railway freight loadings during the same period totaled 757,784 cars, 4.4 per cent more than the figure for the week before and 11.0 per cent above the corresponding number recorded in 1948.

Crude oil production in the week ended April 9 averaged 4,916,050 bbl daily, 156,550 bbl less than in the preceding week and 461,350 bbl below the comparable output in 1948.

Production of bituminous coal and lignite during the same week is estimated at 11,260,000 net tons, 11.7 per cent more than the output in the week before but 5.1 per cent below the corresponding quantity in 1948.

Civil engineering construction volume reported for the week ended April 14, according to *Engineering News-Record*, was \$158,193,000, or 11 per cent less than the preceding weekly figure but nine per cent above the comparable sum in 1948. The total recorded for 15 weeks of this year was 25 per cent more than the corresponding amount in 1948. Private construction for the period was 31 per cent above that a year ago, and public construction increased by 20 per cent.

The wholesale price index of the Bureau of Labor Statistics during the week ended April 12, at 157.6 per cent of the 1926 average, was 0.3 per cent less than in the preceding week and 3.1 per cent below the corresponding figure in 1948. The decline in the general index reflected price reductions in all major groups of commodities.

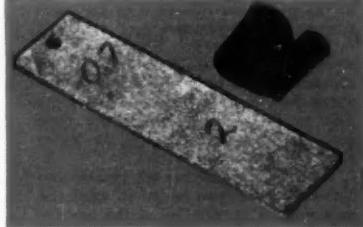
Member bank reserve balances increased \$16 million during the week ended April 13. Underlying changes thus reflected include decreases of \$88 million in Treasury deposits with Federal Reserve banks and \$11 million in Treasury cash, accompanied by a decline of \$87 million in Reserve bank credit.

Total loans and investments of reporting member banks declined \$130 million during the week ended April 6. The sum of these business loans, \$14,267 million shows a net increase of \$197 million in 12 months.

**IT'S ALL FOR THE GOOD OF SIRVIS...**



**THE BOIL TEST**



Boiling would be rugged treatment for any steer. But, for Sirvis steerhide it's a must. The boil test, which is more severe than either dry heat or hot oil tests, determines heat resistance, measured by shrinkage. Because of Sirvis tanning processes, shrinkage under the boil test is usually less than 1%. Sirvis' reaction to the test is demonstrated by two pieces of buff grain steerhide, identical in quality and dimensions. After boiling in the same container for thirty minutes, one piece, an ordinary vegetable tanned leather, was hard, curled and shrunken, as shown in the photograph. The Sirvis chrome retanned piece shrank only 0.7% . . . retained its natural flexibility, strength and texture . . . and its resistance to heat was thereby accurately determined.

This is just one of the many laboratory controlled tests to which Sirvis leathers are subjected . . . so that you may be assured of top quality in packings, boots, gaskets, diaphragms and other mechanical leather products. Because of extreme care in designing, excellence of materials, and constant checks in production, Sirvis mechanical leathers are outstanding in dependability.

\* For detailed information about Sirvis products, write for the free Chicago Rawhide catalog.

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**SIRVIS** CHICAGO RAWHIDE MANUFACTURING COMPANY

1310 Elston Ave., Chicago 22, Illinois

New York • Philadelphia • Detroit • San Francisco • Cleveland • Boston  
Pittsburgh • Los Angeles • Cincinnati • Minneapolis • Syracuse • Peoria



## Eaton's Remodeled Facilities

(Continued from page 33)

istics. Cores can be tested with from one lb to 60 lb of water per minute passing through the core and with up to 600 cu ft of air per minute passing over the radiating surface. Resistance of water and air passages are also measured at this bench.

After the components have been thoroughly inspected, the completed experimental heater is tested at the major wind tunnel (see Fig. 2). In the plenum chambers on the left side of

the panel, heating and defrosting characteristics of the unit can be tested simultaneously or independently. In the top chamber the volume (CFM) of the car heating air is measured and in the chamber at the bottom the same characteristics of the car defrosting air is checked. In the right-hand section of this wind tunnel there are instruments mounted on a panel which are used for testing any type of automotive heating, defrosting and venti-

lating unit. At the top left and middle left sections of this panel are inclined draft gages for measuring, in inches of water, heating air pressures and defrosting air pressures simultaneously. The instruments at the lower left side of the panel are a voltmeter and an ammeter used to measure the power requirements of the test unit. The large instrument in the center of this panel is an electric potentiometer which, by means of thermocouples, indicates temperatures up to 24 different points in the heating, defrosting and ventilating units.

The first two switches reading from left to right on the bottom of the panel of this same wind tunnel control the amount of air passing through the heating air chamber and the defrosting air chamber of the wind tunnel by means of motor operated dampers. The third switch operates the blower for the defroster wind tunnel; the fourth switch operates the blower for the heater wind tunnel; the fifth switch operates a motor generator set which is the source of direct current power; the sixth switch operates the water pump. The last four switches operate four electric heating elements in the hot water circulating system. Three of these switches operate immersion type heating elements directly. The fourth operates the fourth heating element through a variable transformer and thermostat which allows the temperature of the water to be automatically controlled to any degree regardless of the size of the heating and defrosting unit that is being tested. The vertical instruments on the right side of the panel are manometers for measuring water pressures and are read in inches of mercury. The left one indicates the resistance of the core and the right one is used for measuring the water flow through the heater-defroster unit by indicating the pressure drop across a calibrated orifice in the water circulation system.

When the experimental heater and defroster have been tested in part and as a unit, it is installed in the car for which it was designed. First of all the heater is checked for ease of installation and then a test is run using portable instruments to make certain that the performance shown by the wind tunnel is being duplicated. Next the car is taken on road tests to check distribution of temperature throughout the car body, check the water rates for various road speeds, and finally to check the performance of the heating, defrosting and ventilating system under actual operating conditions at various outside temperatures.

Another function of the Engineering Laboratory is to test production units for quality control. Units are picked at random from the production line and are tested on the third wind tunnel, which is shown in Fig. 3. All tests at this point are made against engineering specifications. This wind tunnel which is portable, is also used for car body air leakage tests.

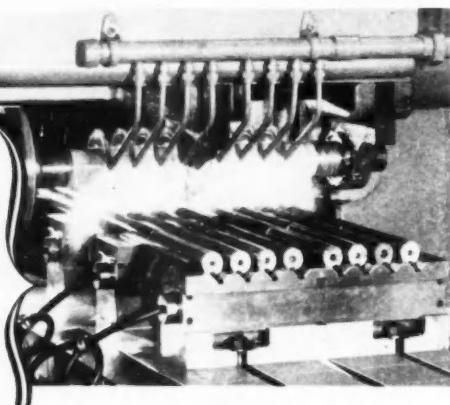
## LOOK-NO CLAMPS!

### ON THIS JOB--

*Power-Grip holds 8 shafts per load, 4 keyways, 5" x  $\frac{1}{2}$ " x  $\frac{1}{4}$ " deep, are milled in each shaft. Castings 6" diameter are fed at 5" per minute. Production and cost advantages result from minimum loading time.*

### SEE IT IN ACTION!

*See this new production holding technique demonstrated. Send us your name, position, and company. Where sufficient quantities required we will plan a demonstration in your city without cost or obligation. Write now, so we can reserve an early date.*



### With DEEP MAGNETIC PENETRATION A NEW PRODUCTION HOLDING TECHNIQUE

That's right! Power-Grip Holding, with its Deep Magnetic Penetration eliminates the need for complex, expensive, holding fixtures, and grips securely odd shaped pieces otherwise normally difficult to hold.

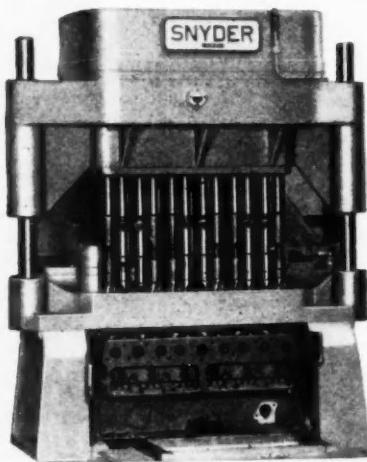
Applied to milling, turning, shaping, planing, or grinding operations, this new holding technique is used for stout, high speed machining cuts. Get the complete story today. Write for a copy of our latest Bulletin, Magnetic Holding Methods.

*Send us prints and specifications for estimates  
on Power-Grip Holding for your Production Jobs*



ROCKFORD MAGNETIC PRODUCTS CO. INC.  
1314 10th AVE., ROCKFORD, ILLINOIS

# SNYDER Machines Cost Less in the Long Run



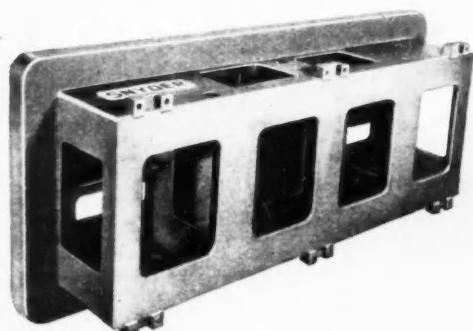
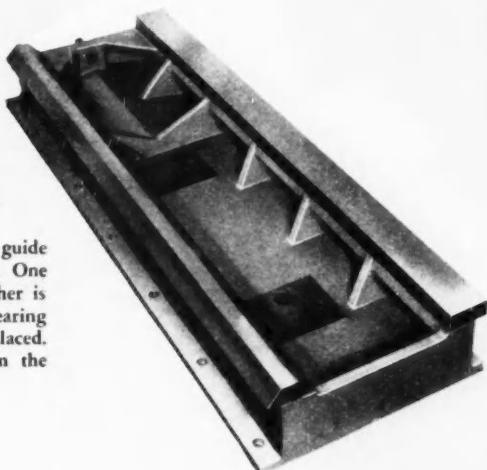
## SNYDER MACHINES USE THEIR HEADS TO SAVE MONEY

A good machine can use its head to save you money. On Snyder heads, for example, spindles, idlers, drivers and pump drive gears are mounted in ball bearings with circulating lubrication. Every time a shaft or gear turns, money is being saved for you. Most heads are built with pick-off gears to cut down time in making speed adjustments. Multiply these savings over a span of 20 years and it is obvious that Snyder craftsmanship costs less in the long run.

## HARD WAYS TO MAKE MONEY FOR YOU

A Snyder feed unit may travel as much as 25,000 miles in the course of a machine's lifetime, so what it travels *on* is important.

We mount feed units on hardened and ground ways or guide bars — hardened for wear, ground for super-smoothness. One of the ways is V-type to keep accurate alignment, the other is flat. They are anchored from the bottom—no holes on the bearing surface to catch grit. They are easily and inexpensively replaced. This top notch craftsmanship costs just a little more in the beginning but saves you plenty in the long run.



## SAFE ON BASE—IF IT'S A SNYDER

You might be surprised at how much attention we give to "tailoring" the base so that it properly supports the machine members—and blends with the design. We use welded steel or cast iron, heavily ribbed, normalized and sand blasted and equipped with properly located leveling screws and hold-down blocks. We lavish attention on the humble base because it is the backbone of every machine and therefore the number one rigidity factor. A good one will always save you money in the long run.

# SNYDER

TOOL AND  
ENGINEERING COMPANY  
3400 E. LAFAYETTE  
DETROIT 7, MICHIGAN

24 Years of Successful Cooperation with Leading American Industries

## Indianapolis Previews

(Continued from page 26)

Engine power seldom is applied to its full amount due to tire slippage. Clancy has strengthened the weaker parts of his car which kept him out of the money last year, and will definitely bear watching. Drive arrangement on this unique model has one propeller shaft going to the forward axle and then a shorter propeller shaft following to the rear axle. Rear suspension is through short quarter elliptic springs

in the rear and transverse in the front. Braking is on all six wheels and Meyer & Drake 270 cu in. engine is used.

Several foreign cars, which are always a definite threat, will be entered this year. A group of Indianapolis businessmen are sponsoring two supercharged Maseratis, one driven by late Ted Horn in the 1948 race and the other a new car with greater power. These cars have good handling qual-

ties and are capable of high sustained speeds. They have front torsion bar suspension, independently sprung. These Maseratis have been engineered for road racing in Europe and incorporate many of the features of Continental road racing cars.

The Bowes Seal-Fast car will be an important runner again in this year's race. Major changes on this car are use of torsion-elastic suspension, front and rear, instead of torsion bar.

The Kurtis-Kraft entry this year will be the same car that finished 9th in 1948. Some modifications have been made. A conventional straight-through tube rear axle replaces the DeDion type rear axle. The rear gear box is the quick change type.

The torsion bars are installed on the lower part of the frame, with arms attached to the lower and forward section of the outer bearing cage. The stationary ends of the front and rear torsion bars have adjusting arms which allow the car to be balanced.

Weights are set unequally on either the front or rear wheels. For example, the left rear wheel is loaded approximately 60 lb more than the right rear. This is to compensate for the shift of loads when the car goes into a turn. The engine in this car is suspended at four points on Lord mounts, thereby eliminating a great portion of the high frequency vibration, which is often the cause of frame and body fractures. A portable starter replaces the starter mounted on the engine and a larger Firestone rubber fuel tank with a 62 gal capacity has been installed.

The Twin Coach Special entered by Lou Fagel has the same engine used in Twin Coach buses, with a few minor adaptations for racing. It is a six-cylinder single overhead cam type, designed by Ed Winfield, and in my opinion, is one of the most efficient gasoline engines in the country. The design of its combustion chamber, exhaust and intake ports, higher compression and better distribution, result in high volumetric efficiency and increased output.

The balance of the entries will be made up of cars that have been built primarily for the 100 mile championship races. These are all rear drive cars. In order to adapt them for the 500 mile classic, the wheelbase is usually lengthened about 4 in., in such a fashion that the car can be readily converted for use in either the 100 or 500 mile races.

This year's race will probably have an influx of new drivers, following the footsteps of Mack Hellings, Johnny Mantz, Lee Wallard, Johnny Parsons, Jack McGrath, and other fine drivers who made such a good showing last year. They will add a great deal of interest to this year's classic.

In a brief description of this type it is difficult to mention all of the cars entered this year. Much thought and sweat goes into designing, engineering, and building racing cars. All will have a good opportunity of finishing up front.

## YOU CAN SEE THE DIFFERENCE IN HOOVER HONED RACEWAYS

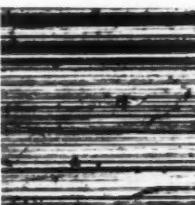
The photographs reproduced at the right are magnified one hundred times, so that you can see the difference between ground, polished and honed raceways. Hoover is America's only ball bearing with honed raceways. The process and the special machines for the honing operation, are exclusive, patented, Hoover developments. Hoover honing goes far beyond grinding and polishing to produce a surface that represents the closest approach to absolute perfection obtainable on a commercial basis.



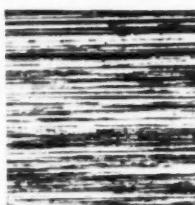
### Honed Raceway Features

Summed up Hoover honing provides the following results . . .

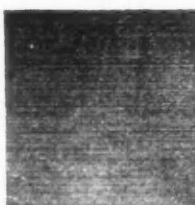
1. Extreme quietness.
2. Increased load capacity.
3. Extended life.
4. Reduced end play (axial displacement).
5. Reduced radial displacement.
6. Permanence of fit up.
7. Increased resistance to Brinelling.
8. Uniformity of fit up.
9. Freedom from vibration.
10. Perfection of dynamic balance.



GROUND RACEWAY SURFACE  
(Photographed at 100 Magnifications)



POLISHED RACEWAY SURFACE  
(Photographed at 100 Magnifications)



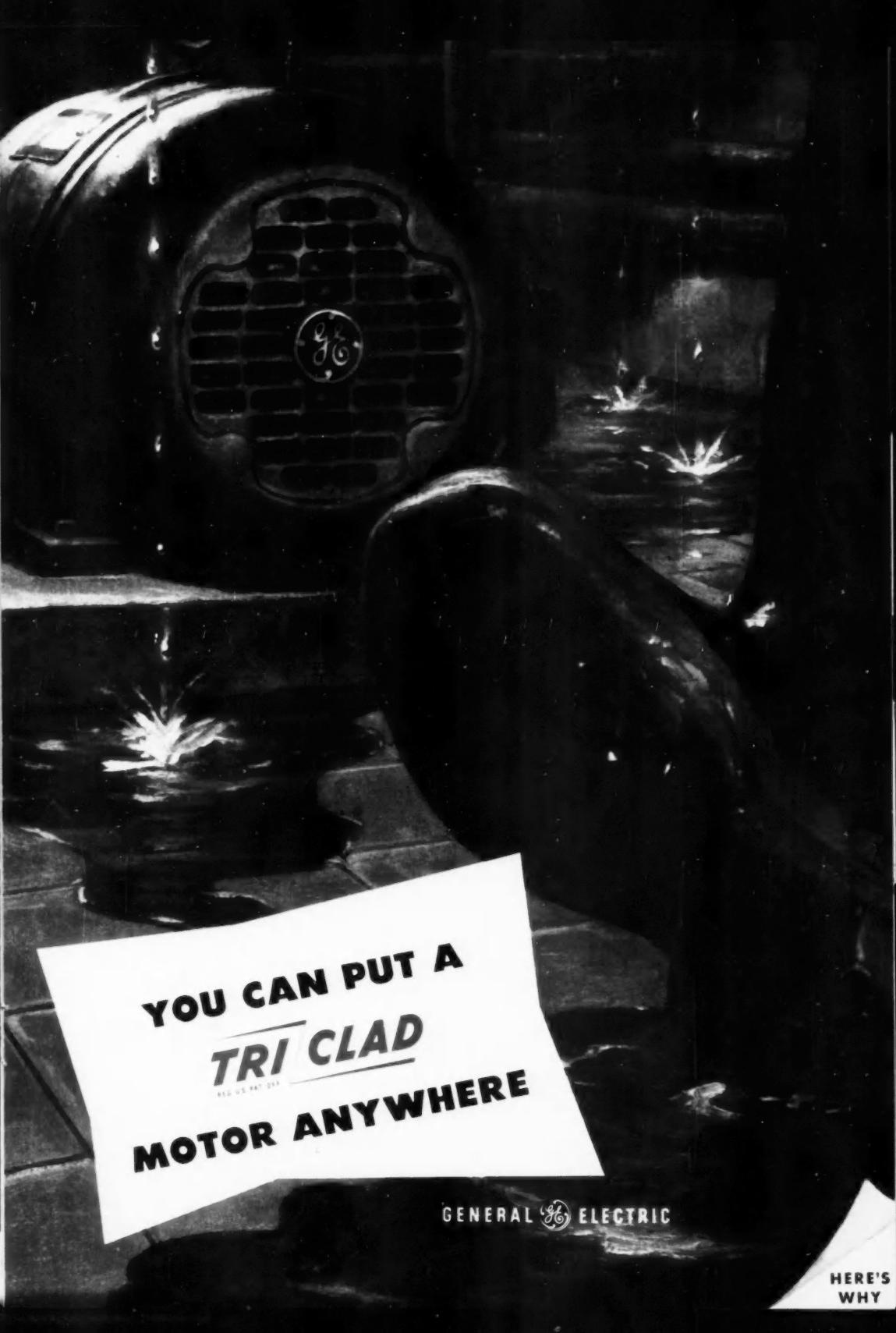
HONED RACEWAY SURFACE  
(Photographed at 100 Magnifications)



**HOOVER BALL AND BEARING CO.,**

A request on your letterhead will bring a copy of the Hoover Engineering Manual.

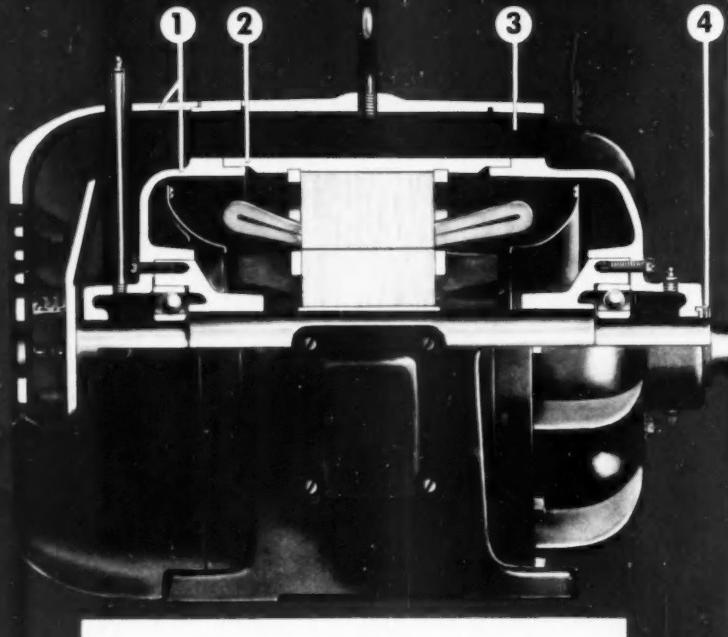
**ANN ARBOR, MICH.**



YOU CAN PUT A  
TRI CLAD  
MOTOR ANYWHERE

GENERAL  ELECTRIC

HERE'S  
WHY



The standard totally enclosed Tri-Clad features a cast-iron double-wall structure (1) that keeps outside air from electrical operating parts . . . machined-fit end shields (2) . . . large air passages (3), easy to clean . . . rotating labyrinth seals (4) that keep foreign matter from working in around the shaft. Note, too, the new corrosion-resistant G-E Textolite cooling fan is now standard on all 1- to 15 hp TEFC Tri-Clads.

## You can put a *TRI CLAD* motor anywhere

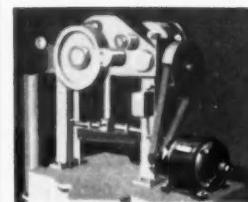
**YES SIR!** The standard *Tri-Clad* open motor is a *cast-iron, driproof* motor you can put anywhere that *any* open motor can be used—and in a lot of places where other open motors couldn't take it.

What's more, for the really dirty jobs—where air is laden with dust, or corrosive fumes—where metal chips and cutting fluids abound—the *Tri-Clad* totally enclosed motor gives you more protection, *inside and out*, than any other make of motor you can buy.

1,720,000 *Tri-Clad* motors, operating in every conceivable kind of plant, prove the far-reaching advantages of cast-iron construction . . . superior resistance to corrosion . . . rigidity that makes for permanent shaft alignment . . . inherent damping action that minimizes noise and damaging vibration. These motors prove, too, that *Tri-Clad* double-end ventilation simply has no equal for prolonging an open motor's useful life. Providing high-volume, relatively low-velocity cooling, this ventilating system keeps *Tri-Clad* motors uniformly "air-conditioned".

**WANT MOTORS THAT CAN REALLY TAKE ABUSE?** *Tri-Clad* motors in nearly all types and ratings are available for **IMMEDIATE SHIPMENT**. Contact your nearest G-E Office or write Apparatus Dept., General Electric Company, Schenectady 5, N. Y.

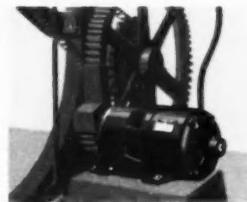
**There's a *Tri-Clad* motor for every industrial need!**



**G-E open (driproof) induction motors for constant-load, constant-speed applications. From 1 to 2000 hp.**



**G-E totally enclosed motors for outdoor operation, in abrasive dusts, or corrosive fumes. From 1 to 1000 hp.**



**G-E gear-motors for low-speed operation. A normal-speed motor with built-in reduction gear. From  $\frac{1}{6}$  to 75 hp.**



**G-E synchronous motors for maintaining exact speeds or for correcting power factor. From 20 to 1000 hp.**

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**EXTRA  
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**GENERAL ELECTRIC**



## Turning Rough Forgings

(Continued from page 46)

Because of the simplicity of this type of machine it lends itself to job lot operation and makes possible continuous runs of a variety of similar parts with a minimum of down time for change-over. In fact, the principal feature of changeover from one part to another is the replacement of templates for guiding the tracer. Timken routes some 15 different pinions over this group of machines.

Pinions are made of drop forgings of TDA 4617 chrome-moly composition and are finish-turned in the two settings right from the rough. Turning is done without cutting fluid at the rate of 500 to 600 sfpm and with a horizontal feed rate of about 12 ipm for the front tool. A valuable feature of the machine is the provision of an automatically controlled speed rate, making it possible to maintain a constant cutting speed regardless of the diameter of the work at various sections.

The first machine of the group is set up to finish the gear end of the pinion shaft—the front face and the cone for the gear teeth. The operation is so fast that the one machine is always ahead of the other two.

Each of the other two machines does the finish-turning of the entire stem end from the rough forging in one setting at the rate of about one piece per minute at maximum capacity. On most of the steps the single-point tool removes approximately  $\frac{1}{8}$  in. of stock on each side. However, on the small diameter at the end of the part, the tool removes  $\frac{1}{4}$  in. of stock on each side. To remove this amount of metal the machine is arranged to cycle twice for the small diameter. The tool removes most of the stock in the first pass, then returns to starting position and repeats the cut to finish dimension. This is all part of the automatic cycle of events. On the average the amount of metal removed is around  $1\frac{1}{2}$  lb.

The steering knuckle, which is a larger part physically, is machined from the rough forging in a group of two Morey hydraulically operated and controlled automatic lathes, tended by one operator. These parts are made from a variety of nickel alloy steels, generally SAE 3130 and are heat treated before machining to a Brinell of 285-341.

The Morey machine is massive and fast, and has a completely automatic cycle. It is provided with front and rear carriages, fitted with multiple tools.

The turning tools in the front carriage are single-point carbide of the same type as used on the Monarch machines. The tools in the rear carriage are carbide-tipped in conventional manner.

Turning is done at the rate of 350 to 400 sfpm and completed at a rate of about 40 per hour for the two machines.

to-floor time of the operation simply eclipses former practice.

### Correction to Bus Listing in Statistical Issue

The P-372 Bus Chassis model shown on line 7, pages 144 and 145 of the March 15, 1949, issue of AUTOMOTIVE INDUSTRIES was incorrectly listed under A.C.F.-Brill Co. This P-372 Bus Chassis model should have been listed under Aerocoach, produced by the General American Aerocoach Co., Chicago 90, Ill. Please note this correction in your copy of this special issue of AUTOMOTIVE INDUSTRIES.

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(41)

## Packard Automatic Transmission

(Continued from page 32)

The governor is of centrifugal type, having two arms serving as weights, and is driven from the speedometer gear. Governor output is in the form of hydraulic pressure, the output curve having reasonably near straight line relation with respect to speed by suitable modification with spring loading. One weight—the one at the top in cross-section—gives the characteristics of the output pressure curve. The other weight serves as a vent valve when car

speed is around 15 mph, and cuts out when the speed drops to between 12-13 mph.

Despite the automaticity of functional control, the device is designed to leave control within the will of the driver so as to meet any variety of operating conditions. Consequently, governor action is modified by throttle pressure — through direct mechanical linkage from the accelerator pedal to one end of the control valve to which

the governor pressure line directed. In effect, therefore, engagement of the direct clutch depends upon the balance of forces exerted by the driver and the governor.

Having this in mind, it is found that around 15 mph car speed, the condition of minimum throttle, governor pressure normally will engage the clutch and place the mechanism in direct drive.

However, at any time the driver can overrule the governor and return instantly to converter drive — for emergency acceleration — by kicking the pedal past full throttle position. Sufficient force is exerted in this manner to counterbalance the maximum hydraulic pressure developed by the governor. Nevertheless, to safeguard the mechanism, governor action is such that it will develop sufficient pressure at 50 mph to overrule pedal pressure with maximum throttle and force the mechanism into direct drive.

This unit has two hydraulic pumps—the large capacity front pump, driven by the front turbine members; and the rear pump, of much smaller size, driven from the tail shaft. Generally speaking, the front pump is in action on starting and accelerating up to a certain range of car speed, thus assuring positive action of the hydraulic system. However, as the vehicle gains momentum the smaller rear pump comes into play with ample capacity at the higher shaft speeds, while the front pump idles.

Hydraulic pressure from each pump is fed to opposite ends of the check valve, the system being so balanced as to cut off the front pump and leave it in idling position when the rear pump finally takes hold. By this means the engine is relieved of the task of driving the large front pump.

Pump pressure varies in accordance with demand for various maneuvers. The front pump develops around 80 to 90 psi for forward motion; and this is about doubled for reverse operation through modulator valving. The rear pump, at operating speeds, will deliver oil at a pressure of around 85 to 95 psi. The front pump has a pressure of about 15 psi at idling speeds. Both pumps are of Eaton Gerotor type with the Gerotor element mounted on the drive shaft.

The main control valve which arranges the ports for each maneuver is positioned by the hand lever. In addition, the mechanism contains other forms of valves designed to perform automatic control functions. Among these are: the front oil pump relief valve, mounted at the front end; the throttle valve; shift valve for direct drive, having a modulator valve at one end; and a transfer valve.

Consider now some of the special functions of hydraulic control. First is the unique arrangement for getting fast but modulated engagement of the bands for "low" and "reverse." As shown in section, the main piston has a small center member as well as a large diameter piston. Function of the small

(Turn to page 72, please)



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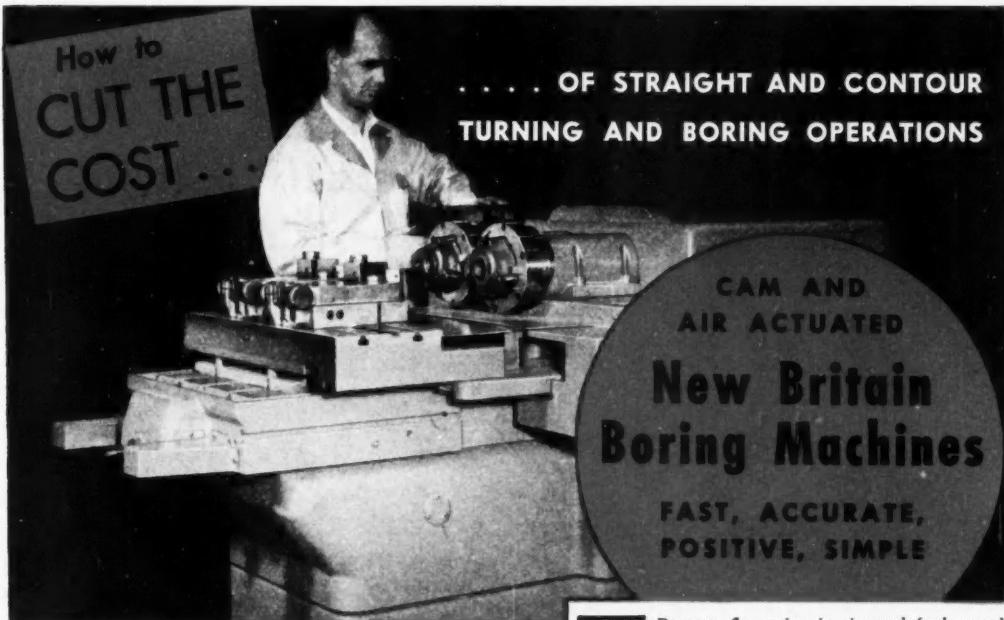
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**BETTER METHOD** Holds .0001 tolerances by reducing tool strain and work torque.

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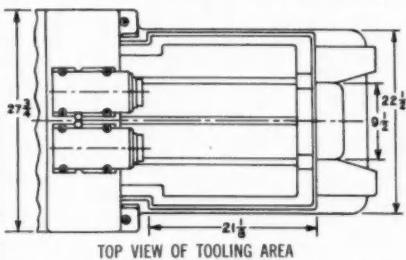
**BETTER METHOD** Rapid traverse to within a few thousandths of work, quick withdrawal, cut idle time.

**BETTER METHOD** Optional automatic loading enables one operator to run more than one machine.

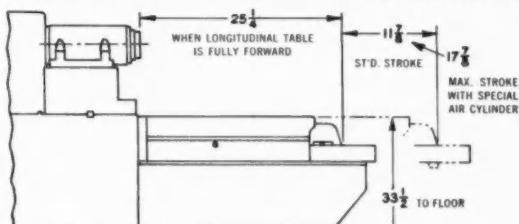
**BETTER METHOD** Choice of tool or work rotating set-up makes tooling easy and flexible.

#### LARGE SIZE TABLE TAKES BIG WORK

Besides doing small work, these machines are capable of mounting large pieces on the tables as shown in the following tooling area sketches:



TOP VIEW OF TOOLING AREA



SIDE VIEW OF TOOLING AREA



The work capacity and flexibility of New Britain boring machines open up unlimited possibilities for finding the better production methods on which successful competition stands or falls. Write for full details, and the brochure, "IT CAN BE DONE" which describes actual cost histories on specific jobs.

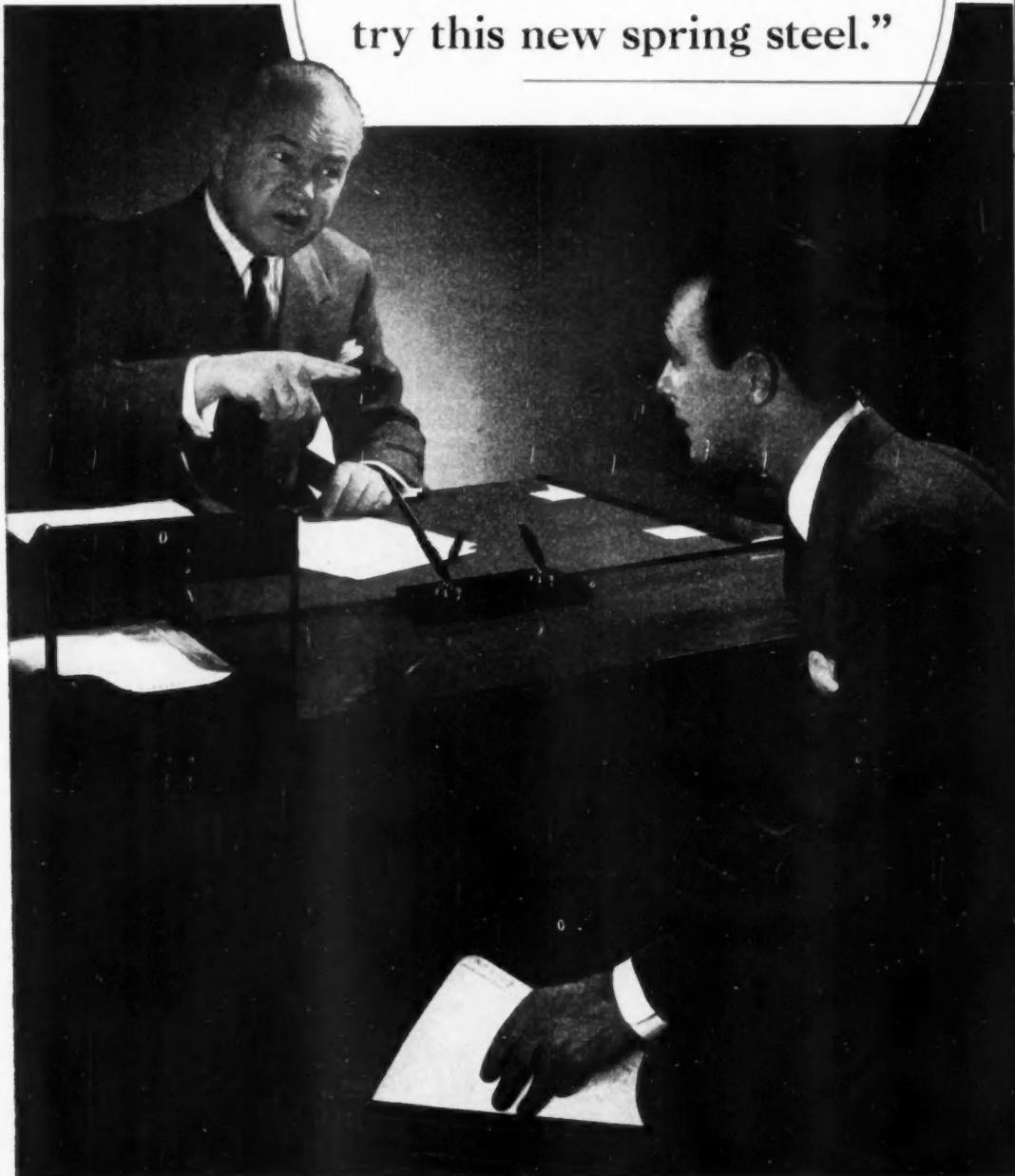


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"First," we told him, "this steel we've developed is lower in cost—in fact will cost you about \$7.00 a ton less. Second, it has a better, smoother surface than the steel you're now using, which means that you'll lessen the danger of failure. And, third, with this steel there is less decarburization during heating and you'll get better strength in your springs."

That conversation took place less than a year ago. Since then this company, one of the largest makers of lower-priced cars in America, has used this steel for passenger car and truck springs...and has effected savings in steel cost alone that will run well in excess of \$100,000 annually.

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The development of this new spring steel, now officially designated as SAE-AISI 5160, is typical of the constant striving of our metallurgical, research, and operating departments to give you, the steel user, steels better suited to your purpose—steels that will improve performance and lower your material and manufacturing costs.

Among such special purpose steels are heavy-duty gear steels like U-S-S SUPER-KORE; superior-strength plate steels like U-S-S Copper-Nickel-Molybdenum; Hadfield Manganese; and Elevated Temperature steels.

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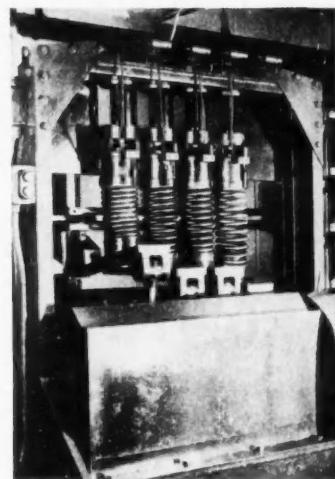
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piston is to take up the slack in the band, just before the band is clamped, and apply a light load on the brake. This is done to take up the standard mechanical clearance between the band and drum. At the same time oil pressure causes the large piston to move and when it has advanced 0.030 in., a check valve to the small piston closes, permitting the large piston to apply the load by completing its cycle. Movement of the large piston is cushioned by the passage of oil through a restricted vent, thus giving rapid but modulated engagement, free from shock.

The shift from low to high range is effected through the timing valve. This

is arranged to permit the "low" brake to hang on until sufficient pressure is built up in the high range clutch to stop any tendency to runaway due to the time lag between brake band disengagement and clutch engagement. This valve also can delay movement from high to low so as to prevent premature engagement of the brake band. Yet the change is permitted to be made at a fast rate to facilitate the "rocking" maneuver between "low" and "reverse." Parking and neutral positions, selected by the hand lever, are comparatively simple maneuvers. When getting into parking position, the engine is idling, the front pump operating, and there is

pressure feed within the converter. As the hand lever is moved into "P" position, the mechanical linkage is moved manually to turn a spring loaded member on a shaft at the rear end of the transmission, as shown in cross-section. This member bears on a pivoted lever which has a pawl at the end for engagement in a toothed wheel. Spring loading of the actuating member permits the pawl to ride over the wheel until it can drop into engagement in a tooth space. This locks the entire shaft and gear system securely to the gear box.

## CALENDAR

### Conventions and Meetings

- Salon International DeL' Aeronautique, Paris ..... April 29-May 15
- Automobile Old Timers Annual Luncheon, New York City ..... April 28
- Chamber of Commerce of the United States Annual Mtg., Washington ..... May 2-5
- British Industries Fair, London ..... May 2-13
- Amer. Soc. for Quality Control, Boston ..... May 5-6
- Natl. Std. Parts Assn., Regional Business Mtg., Atlanta ..... May 9
- Amer. Management Assoc. Nat'l Packaging Exp., Atlantic City ..... May 10-13
- Instrument Soc. of America, Annual Mtg., Toronto, Can. ..... May 12-13
- Soc. for Experimental Stress Analysis Mtg., Detroit ..... May 19-21
- Auto. Eng. Rebuilders Assoc. Annual Convention, Baltimore, Md. .... May 19-21
- Paris Fair, Paris, France ..... May 21-June 6
- Natl. Std. Parts Assn., Regional Business Mtg., Philadelphia ..... May 22
- Middle Atlantic Regional Automotive Show, Phila. ..... May 23-30
- Assoc. of Amer. Battery Mfgs., Spring Mtg., French Lick Springs ..... May 25-27
- Canadian Int. Fair, Toronto, May 30-June 10
- SAE Summer Mtg., French Lick, June 5-10
- Phila. Auto. Trade Assoc. Show, Phila. ..... June 11-18
- American Inst. of Elec. Engineers, Swampscoot, Mass. ..... June 20-24
- Amer. Soc. for Testing Materials Annual Mtg., Atlantic City, June 27-July 1
- Amer. Electroplater's Soc. Annual Convention, Milwaukee, June 27-30
- SAE West Coast Mtg., Portland, Aug. 15-17
- Canadian Natl. Aircraft Exhibition, Toronto ..... Aug. 26-Sept. 19
- Instrument Soc. of America Convention, St. Louis ..... Sept. 12-18
- Inst. of Traffic Engineers, Washington, D. C. ..... Sept. 25-28
- British Passenger Car Show, London, Sept. 28-Oct. 8
- Society of Industrial Packaging and Materials Handling Engineers Annual Exposition, Detroit ..... Oct. 4-7
- Chicago Auto Show, Chicago ..... Nov. 4-12

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\* Photograph shows Model TLDT-20 12-ton crane with 1/2-yd. clamshell bucket.

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Write for descriptive literature.



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## Gooseneck Trailer

(Continued from page 44)

carried in the table under the column marked "Measured." For those points where the stresses could be mathematically calculated with reasonable accuracy using simple elastic theory this was done and these values are carried in the column noted "Calculated." It will be noted from the table, gages No. 16 through No. 20, the measured and calculated values of stress are in close agreement. These gages were in the straight portions of the I-beams ahead of the gooseneck curvature.

As would be expected the highest stresses were observed at the inner radii of curvature of the gooseneck. At these points gages No. 3, No. 6, No. 10 and No. 15 show stresses about twice as high as those on the straight portions of the beams, this despite the fact that the section in the curved portion of the beam is much deeper than the straight. This high stress at the inner radius is of additional importance when it is recognized that many Carryalls have no radius at these points of stress concentration. This particular design is unusual in having large and generous fillets at the points of stress concentration, yet the stress even here is twice the normal value.

As the steel comprising the Carryall was of the type ASTM A 242-42 having an ultimate tensile strength of 78,400 psi and a yield of 54,900 psi, the stresses even at the most highly stressed point are safely below the yield. For example, the stress at gage No. 20 at the design load of 220,000 lb is 27,800 psi or about one half the yield point of the steel. Of further interest is the rapidity with which the stress drops on a radial plane in from the fillets. Gages No. 11 and No. 12 are but three in. from gage No. 10 yet the stress has dropped from 20,250 psi to 3675 psi.

It may be concluded that in the design of vehicles of this type every effort should be made to provide large fillets for the gooseneck structure if stress concentrations are to be avoided.

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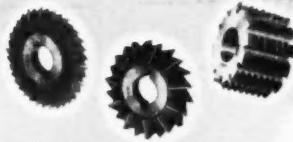
Brass.....	250° F.
Bronze.....	325° F.
Monel.....	800° F.
Stainless.....	800° F.
Inconel.....	1700° F.

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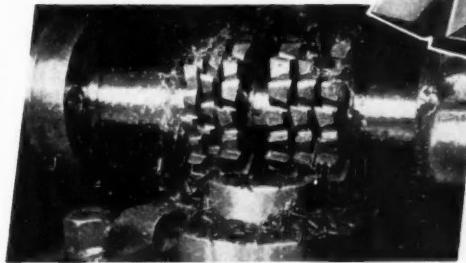
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*Life-Line*



**Motors**

## Machining Slipper-Type Piston

(Continued from page 41)

another machine. Fitted with cemented-tungsten-carbide fly-cutters, the machine has a special cycle consisting of a fast boring cut coming in, and a light cut on the return stroke. The bore is held to a tolerance of 0.0002 in. At the end of the line these bores are bearing-sized.

The piston skirt is cam-ground to elliptical form, held to precise limits, in a battery of new external grinders fitted with a special cam grinding attachment. The equipment illustrated

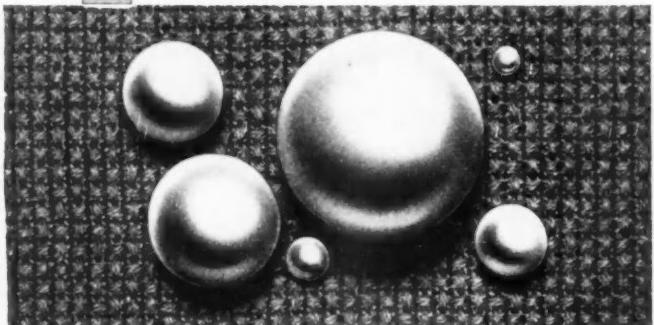
here was chosen specially because of the virtues of this cam-grinding attachment together with the electronic control of the entire cycle which marks its unique feature. This form of control assures the correct alignment of the skirt with respect to governing elements.

Following grinding, pistons are machined to a common weight in the conventional type of piston balancing machine, used heretofore, milling being done on the two locating pads mentioned earlier.



The second of the new electric piston gaging machines shown here checks the ring grooves as well as the dimension from the top of the head to the center of the piston pin bore.

size and spherical accuracy  
IN perfection of surface  
uniformity—dependable physical quality



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And the service results from every Strom metal ball prove it—not only in the finest precision ball bearings but also in the lot of other ball applications where Strom balls are doing the job better.

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### BOOKS . . .

ROCKET PROPULSION ELEMENTS by George P. Sutton, pub. John Wiley & Sons. Although many problems concerned with space travel remain to be solved, the basic physical question as to whether a vehicle can escape the earth has been theoretically solved. In one of the later sections of this book the author devotes attention to what has been a Sunday Supplement feature up to now—the space ship, discussing the rocket space ship which becomes a satellite of the earth, the interplanetary space ship; and escape from the earth and the solar system as well. Here is a textbook on a subject cloaked in mystery because of wartime security regulations. In it the author presents the basic elements and technical problems of rocket propulsion, and describes the general physical mechanisms and designs of rocket propulsion systems. It is intended not only as a reference book for those engaged in rocket propulsion but as a college textbook as well. Major emphasis is placed upon liquid propellents, only one chapter being devoted to solid propellant rockets. The subject is introduced with a history of rocket developments, then proceeds to sections dealing with nozzle theory, thermodynamic relations, liquid rocket propellents, liquid rocket motors, feed systems, testing, etc. Profusely illustrated and replete with tabular data, this text features material on the properties of metals at elevated temperatures to enhance its value materially. The author is well qualified to present this subject authoritatively, having been associated with rocket development, his present post being supervisor, propulsion development, of North American Aviation; and instructor, university extension, University of California.

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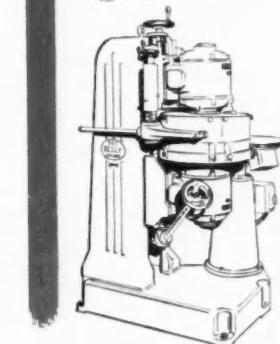
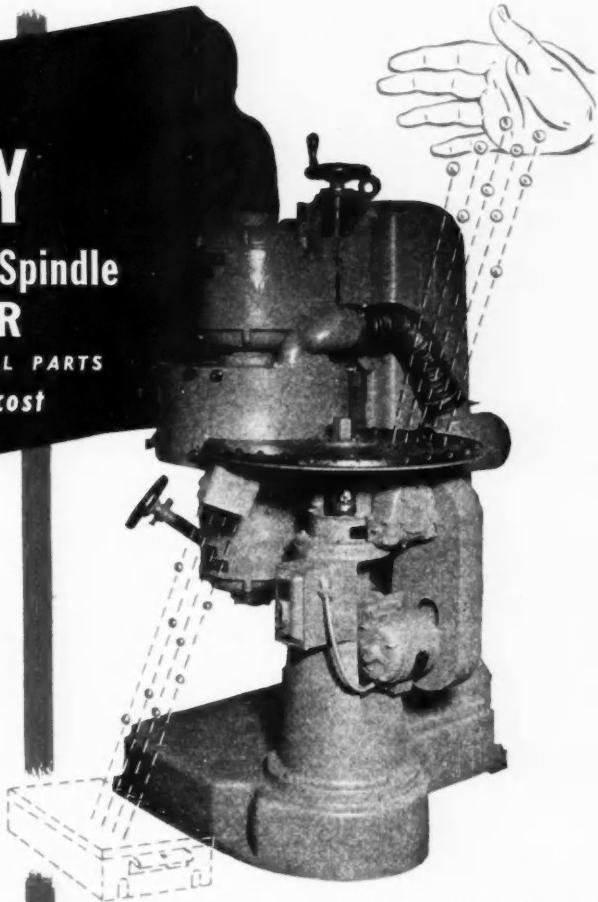
High speed production on close tolerance small parts grinding is easily achieved with this versatile No. 905 Besly. It's a proved design with new and unique features that speed up output. Grinds wet or dry—as fast as it can be loaded: 2400 pieces per hour manually, 5000 or more with feeder attachment depending on material and area to be ground.

In addition to coil spring ends, carbon brushes, ceramics and plastics, the "905" handles a large variety of small steel, aluminum, copper, brass, gray iron and other parts—fed manually, by magazine or by hopper.

The "905" may answer your many problems of stabilizing production costs. Why not discuss the possibilities with a Besly engineer?

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Write for this free booklet which offers helpful facts on abrasive wheels... It contains valuable data on grinding wheels and abrasives. Learn how Besly-Titan Steelbacks cut "down time" and boost output.



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- Faster Loading is attained by horizontal feed wheel. Unloads automatically by gravity.
- Designed Especially for small parts grinding — four times as fast as previous methods.
- Saves Money: supplies the need for an intermediate size machine.

## SPECIFICATIONS

Double vertical spindle type. May be equipped to grind wet or dry. Choice of 15", 16" or 18" diameter abrasive discs. Motors: 3 H.P., 1750 RPM. Overall length: 41 $\frac{1}{4}$ ". Overall width: 41 $\frac{1}{4}$ ". Height: 66".

*Maybe GRINDING is the Better Way . . .*

Better Check with

**BESLY GRINDERS AND ACCESSORIES**  
**BESLY TAPS • BESLY TITAN ABRASIVE WHEELS**

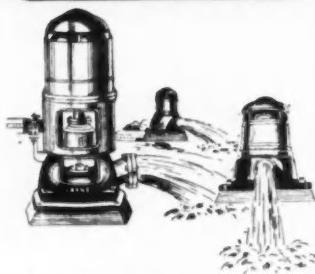
**BESLY**

CHARLES H. BESLY & COMPANY • 118-124 North Clinton Street, Chicago 6, Illinois

Factory: Beloit, Wisconsin

# BIG OR LITTLE

They All Have the  
Same Layne Quality



Layne has constantly maintained the highest quality of materials and finest precision manufacturing in all of their Well Water System installations. The smallest are just as substantial in construction and as high in efficiency of operation and always produce proportionately as much water as the biggest. This fact has been proven time and again to the complete satisfaction of hundreds of owners.

When Layne builds a Well Water System, more than fine casing, impellers, shafting, motors and skillful manufacturing are used. Layne's reputation extending back over nearly three quarters of a century as the world's most capable well water developers is included.

All Layne Well Water Systems are equipped with the famous high efficiency Layne Vertical Turbine Pumps. These pumps are designed and manufactured exclusively in Layne's own plant where every detail of their construction and assembling is under the supervision of engineers.

**Write for catalogs and information about Layne's complete service which includes surveys, water strata explorations, pump installations, etc., for a complete Well Water System. Address LAYNE & BOWLER INC., General Offices, Memphis 8, Tenn.**



# LAYNE

WELL WATER SYSTEMS

AFFILIATED COMPANIES: Layne-Arkansas Co., Stuttgart, Ark.; Layne-Alabama Co., Tuscaloosa, Ala.; Layne-Tennessee Co., Memphis, Tenn.; Layne-Northeastern Co., Mishawaka, Ind.; Layne-Louisiana Co., Lake Charles, La.; Layne-Texas Co., Houston, Tex.; Layne-New York Co., New York City; Layne-Northwest Co., Milwaukee, Wis.; Layne-Ohio Co., Columbus, Ohio; Layne-Michigan Co., Saginaw, Mich.; Layne-Illinois Co., Chicago, Ill.; Layne-Minnesota Co., Minneapolis, Minn.; International Water Corporation, Pittsburgh, Pa.; International Water Supply, Ltd., London, Ont., Can.; Layne-Hispania Americana, S. A., Mexico, D. F.

## Personals

(Continued from page 53)

D. A. Kimball, appointed by President Truman as Assistant Secretary of the Navy for Air.

Dearborn Motors Corp.—Promotion of James M. Swetland as Manager of the New Product Investigation Dept. has been announced. Robert J. Brown has been made Business Manager. He replaces E. J. McMahon, who has been appointed controller of Wood Bros., Inc., a Dearborn Motors subsidiary.

M. W. Kellogg Co.—Dr. W. E. Hanford, Director of Petroleum and Chemical Research, has been elected a Vice-President of the company.

Dana Corp.—Eric C. Sudhoff has been made Director of Purchases with responsibility for purchasing policies in all divisional plants. Angelo Diana had been made purchasing agent for the Spicer plant in Toledo.

Auto-Lite Battery Sales Div. (Canada)—J. Roy McLean has been appointed Sales Manager.

Kent-Moore Organization, Inc.—Dan R. Abbey has been made Vice-President in charge of sales and T. F. Walker, Vice-President in charge of production.

The company is supplier of service tools to General Motors, Nash, Studebaker and Hudson.

International Harvester Export Co.—Paul L. Molnar has been appointed Manager of Industrial Sales.

Jessop Steel Co.—Promotions of production personnel have been announced as follows: Arthur B. Cooper is now assistant to Vice-President in charge of operations, C. A. Gordon. Mr. Cooper was formerly Asst. General Supt. Edwin C. Thomas, Jr., is General Supt., and Benjamin H. Brown is Supt. of Electric Furnace Dept. Joseph W. Stier has been appointed Supt. of Scheduling.

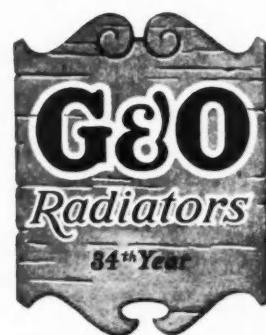
Ampco Metal, Inc.—Irving S. Levinson has been appointed to supervise all Ampco operations which pertain to the Process Industries.

Lockheed Aircraft Corp.—R. H. Askew, formerly export sales manager, has been named sales representative for Australia, India and the Far East.

G. M. Giannini & Co., Inc.—Rear Admiral Luis de Florez, USNR, has been elected to the Board of Directors.

Sun Oil Co.—The election of Joiner Cartwright, of Beaumont, Texas, as Assistant Secretary, has been announced.

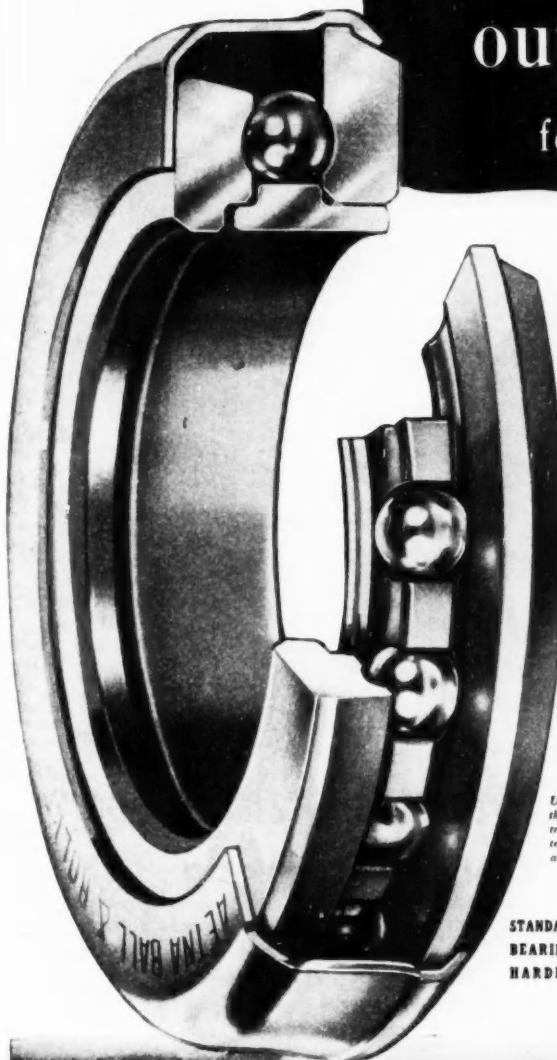
AUTOMOTIVE  
INDUSTRIES  
Goes into  
Leading  
Plants in the  
Automotive  
and Aircraft  
Industries



AUTOMOTIVE and AVIATION  
ENGINE COOLING RADIATORS  
•  
OIL COOLERS  
•  
THE G&O MANUFACTURING CO.  
NEW HAVEN  
CONNECTICUT

# Out of sight, out of mind

for vehicle life



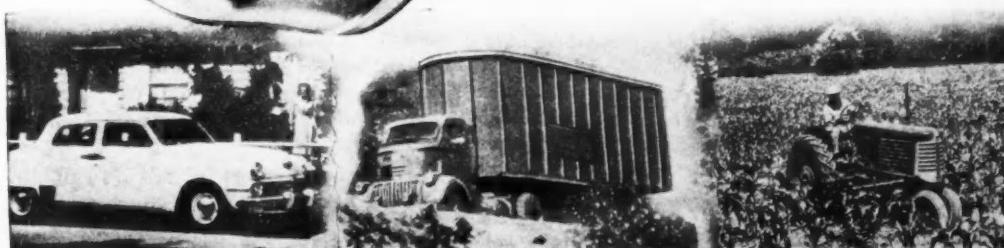
Silent, smooth, carefree performance for vehicle life—these are the qualities you want in every working part of the cars, trucks or tractors you make. Particularly in the parts of hard-to-get-at assemblies where failures mean major repair bills and sales-reflecting complaints.

For those hard working clutch assemblies, for instance, it's good business to specify Aetna T type clutch release bearings. Aetnas, as you can see in the cross section opposite, are designed with one-piece, T shaped oil impregnated bronze ball retainers which end all the troubles common to conventional type bearings. Note, for example, how the T locks balls and raceways in permanently true alignment. That means complete absence of eccentric thrust and its resultant noise and punishing wear. Aetna design provides an exceptionally large grease reservoir that's factory-packed with the best lubricant obtainable. Thus Aetnas are not only pre-lubricated but POSITIVELY lubricated for life. Nor can the lubricant escape and cause slippery clutch facings. No oil fittings, no extra installation or maintenance costs are necessary. Investigate. Learn the many other reasons Aetnas deserve a place in your specifications. **AETNA BALL AND ROLLER BEARING COMPANY, 4600 Schubert Avenue, Chicago 39, Illinois. In Detroit: SAM T. KELLER, 2457 Woodward Avenue.**

*Used as standard equipment by more than 50% of the country's leading car, truck and tractor manufacturers. Protected by U. S. Patents Nos. 1958725 and 2140818.*

**Aetna**

**STANDARD AND SPECIAL BALL THRUST BEARINGS • SPECIAL ROLLER BEARINGS • ANGULAR CONTACT BEARINGS • BALL RETAINERS HARDENED AND GROUNDED WASHERS • SLEEVES • BUSHINGS**





## **EXIDE BATTERIES put "ZIP-AND-GO" in Diesel engine cranking**

That's because they're built specifically for the job . . . built with extra power for the toughest of off-the-highway cranking . . . built with extra ruggedness to withstand hard service, year after year, in all climates. You can always count on Exide Batteries for dependable performance, long life and low cost maintenance.

Exide engineers have a thorough understanding of Diesel cranking requirements. This has been gained from long and close association with the Diesel industry, and from more than three-score years of battery-building experience. Exide engineers will be glad to cooperate with you in applying storage batteries to fit your needs.

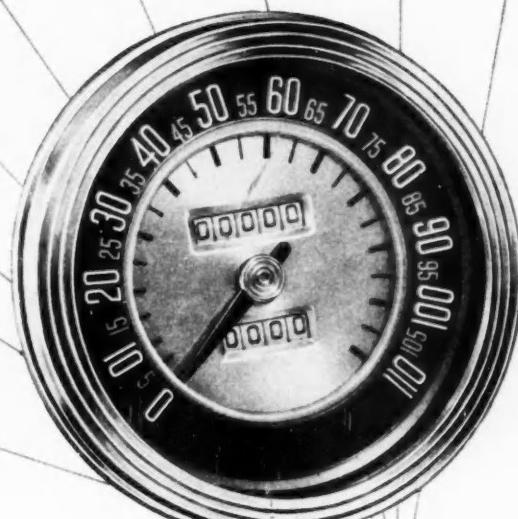
**Exide**  
**BATTERIES**

1888—DEPENDABLE BATTERIES FOR 61 YEARS—1949

"Exide" Reg. Trade-mark U. S. Pat. Off.

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32 • Exide Batteries of Canada, Limited, Toronto

# *A greatly improved speedometer* by KING-SEELEY



OLD  
TYPE MAGNET



NEW,  
CUNIFE MAGNET

The performance, dependability and service life of an automotive speedometer depends primarily on its permanent magnet and the ability of that magnet to retain its initial strength under all operating conditions.

A new and much superior magnet is now being used exclusively in King-Seeley speedometers. It is made of Cunife, a very powerful magnetic material having unusual physical properties which has made possible an instrument of greater accuracy, dependability and longer life.

Specifically, this new Cunife magnet provides 30% more force with only two-thirds of the weight of the previous magnet. The new material has reduced bearing load 50% and is 750% more stable. It is far more resistant to temperature variations, vibration, shock and the effects of stray magnetic fields.

This is another result of King-Seeley's continuing research program which has for many years led the march of progress in the field of automotive instruments.

5038

KING-SEELEY  
*Corporation*

PLANTS IN • ANN ARBOR  
GRAND RAPIDS • YPSILANTI

We can  
help you  
simplify  
your Alloy Steel Requirements

Since the war many users of alloy steels have asked us to assist in simplifying their grade requirements. In practically all cases put before us we have been able to recommend the use of fewer grades without sacrificing or compromising essential properties.

An outstanding example: Recently a manufacturer of industrial equipment submitted for our advice 40 different specifications he had been using, involving many

different analyses of steels and a wide variety of mechanical properties. As a result of their study our metallurgists were able to reduce the requirements to 2 specifications that involve only 2 grades of steel and 2 sets of mechanical properties. The manufacturer followed this recommendation, and has made substantial savings.

By simplifying your alloy-steel requirements you obviously reduce the possibilities for error: you

can order in larger quantities; and you can usually get better deliveries. We will be glad to give you sound metallurgical advice and help solve your problems on specifications, grades and properties.

We manufacture all the various AISI steels as well as special grades of alloy steel for every purpose.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.  
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation  
*Export Distributor:* Bethlehem Steel Export Corporation



B E T H L E H E M   A L L O Y   S T E E L S



**BONDERIZING**  
comes between ZINC  
and PAINT . . .  
to keep them *together!*

PROPER surface preparation is essential to prevent peeling and flaking of paint finishes applied over zinc coated sheets and zinc die castings.

Bonderizing produces a corrosion inhibiting surface on zinc and its alloys which effectively prevents chemical reaction between the zinc and the paint ingredients.

The nonmetallic crystalline Bonderite coating is integral with the metal itself, thus providing a secure anchor for the

paint and retarding the formation and spread of corrosion.

Bonderizing for zinc is simple, economical and effective. Investigate it for your zinc production.

**TECHNICAL BULLETIN AVAILABLE NOW!**

Write today for details on Bonderizing for zinc. Free technical bulletin will be mailed on request.



Bonderite, Parco, Parco Lubrite—Reg. U.S. Pat. Off.

# PARKER

**PARKER RUST PROOF COMPANY**  
2178 East Milwaukee Ave.  
Detroit 11, Michigan

BONDERIZING Holds Paint to Metal . . . PARKERIZING Inhibits Rust . . . PARCO LUBRIZING Retards Wear on Friction Surfaces

# Both Maker and User Save...

WITH INLAND SELF-SEALING WEATHER STRIP



## Low installation cost with Inland's permanent weatherproofing

The builder of trucks, cabs, buses, passenger cars or any motor vehicles must consider *actual cost* of weather-sealing windshields and windows. Usually it's a *high cost* . . . a two-man job, with preparation, sub-assembly, slow installation, reworking and clean-up.

But not the Inland way. One man does it all. Using no cement, he slides the Inland seal into the body

panel opening, eases the glass into the seal, and zips the filler strip into the locking channel. That's all . . . an easy, fast, low-cost job.

And Inland Self-Sealing Weather Strip helps greatly to sell the vehicle to any operator. It means permanent leakproofing in any weather, and glass replacements made easily with little loss in the operating time that pays profits.

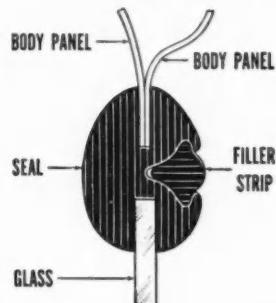
INLAND MANUFACTURING DIVISION  
GENERAL MOTORS CORPORATION

DAYTON, OHIO



# Self-Sealing Weather Strip

(PATENTED)



See how easy it is? The seal goes readily into the body panel. Then the glass fits into the seal. Then the filler strip is zipped into the locking channel. That window or windshield is weatherproofed for keeps. Simple, easy, fast, economical!

**BRANDT IS NOW PRODUCING  
AUTOMOTIVE  
STAMPINGS**

**FOR ASSEMBLY LINE PRODUCTION**

Heavy metal stampings (shown at right) are a typical Brandt job for one of the world's largest automotive manufacturers. Here's precision mass production to meet exacting specifications and rigid delivery schedules.

**FOR DISTANT ASSEMBLY LINES**

Skilled workmanship, ample stockpiles, transportation advantages, complete engineering and production facilities add up to an **EXTRA PLANT** for you without production headaches.

**INQUIRIES QUICKLY ANSWERED**

From receipt of inquiry all quotations are handled by the Engineering Department and promptly expedited.

**PRESSED STEEL SHAPES & STAMPINGS**

Brandt is equipped for mass production of pressed steel shapes such as rub rails, posts, roof ribs, channels, stakes, and door panels. Complete or component part stampings for cars, trucks, trailers, busses, and airplanes.

WRITE FOR  
CATALOG #300  
SEND SAMPLE OR DRAWING  
FOR QUOTATION

**BRANDT**  
BALTIMORE

when it's gotta fit—

**BRANDT MEASURES UP TO EXACTING METAL WORKING SPECIFICATIONS**  
**AUTOMOTIVE STAMPINGS — HEAVY WELDMENTS — PRESSED STEEL SHAPES**

200,000 sq. ft. of coordinated  
stamping, shaping, and welding facilities  
— all under one roof

CHARLES T. BRANDT, INC.

1700 RIDGELY ST.

BALTIMORE 30, MD.





FOR A SHARPER IMAGE OF  
**TOP PROFITS IN TELEVISION  
 PRODUCTION and SALES**

... set-builders use

**AMERICAN PHILLIPS SCREWS**

**SEE NEW PRODUCTION PROFITS:** Assembly of costly television sets puts a prohibition on spoilage. That's why American Phillips Screws are used, to help keep sets rolling out to an eager market, and to keep rejections down. No delays or losses, then, and output hits the main channel with highest return per man-hour, which means time-savings up to 50%!

**SEE NEW SALES-STIMULATION:** Smoothly finished, unmarred cabinet work is the basis of television-set sales. And that's the way sets come from an assembly department using *American Phillips Screws*.

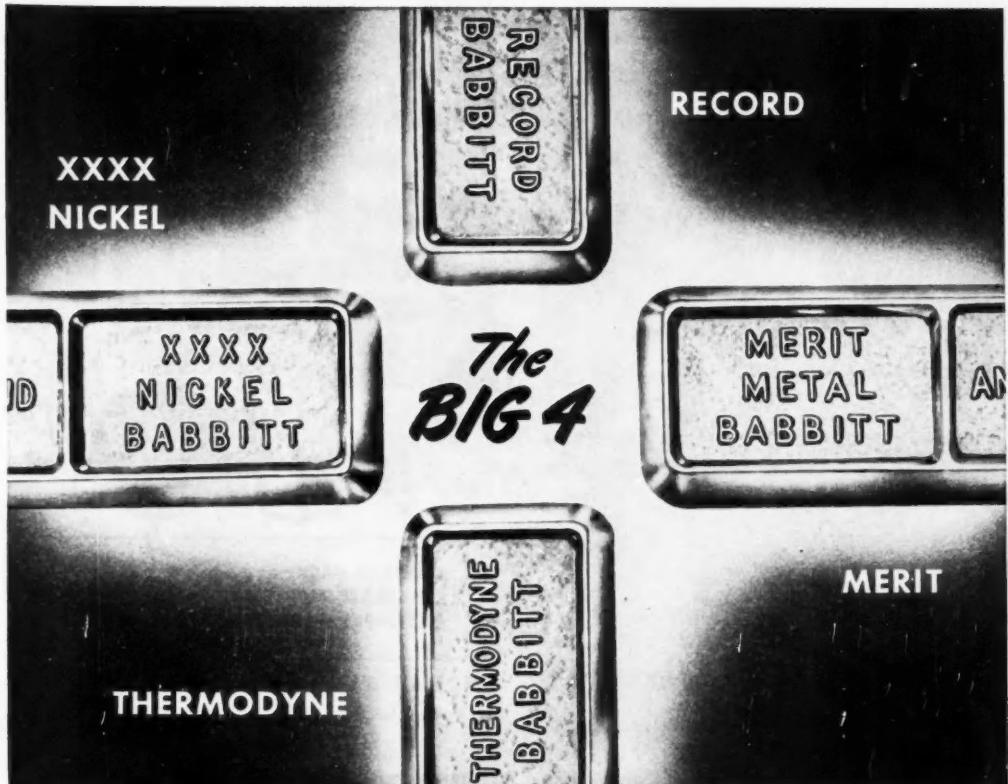
Does YOUR product have this double-feature of production-economy and sales promotion? Then write:

**AMERICAN SCREW COMPANY, PROVIDENCE 1, RHODE ISLAND**  
 Chicago 11: 389 E. Illinois St.      Detroit 2: 502 Stephenson Building

**AMERICAN  
 PHILLIPS**

*Screws*





JM-Lco F-88

## FOR EVERY BEARING NEED!



Most white metal bearing problems can be successfully solved by using one of the Federated Big 4 Babbitts—Thermodyne, XXXX Nickel, Merit and Record.

Thermodyne and XXXX Nickel are tough, dense-grained tin-base babbitts for heavy bearing loads at high speed operation.

Merit and Record are ductile, low-cost lead-base babbitts for lighter loads at more moderate speeds.

The Federated Big 4 branded babbitts are scientifically designed to answer most white metal bearing needs, and thus to simplify your bearing problems. For special requirements, alloys of any composition can be supplied.

To order, or to obtain more information, call or write the nearest of Federated's 11 plants and 24 sales offices across the nation.

Federated also makes many other non-ferrous products, including copper-base alloys, aluminum and magnesium alloys, solders, die casting metals and fabricated lead products.



# Federated METALS

Division of American Smelting and Refining Company, 120 Broadway, New York 5, N.Y.

# COSTS... MUST BE REDUCED

Costs CAN be sharply reduced by the use of CAMCAR'S Cold headed Special Fasteners and Functional Parts.

**\$200,000 SAVED**

Radio manufacturer saved \$200,000 in a single year by employing a part redesigned by Camcar for production by the cold upsetting process.



## ONE PIECE INSTEAD OF TWO

Combining the two parts formerly used into a single integral unit. Cold upset production saved parts cost and assembling expense.

**50% SAVED**

Automobile manufacturer, cooperating with Camcar, was able to save 50% by modifying a design for production by cold upset methods.



*also* . . . manufacturers of:

- ★ STAINLESS STEEL standard screws.
- ★ Sheet Metal Screws . . . steel and Stainless Steel.
- ★ Steel, Brass, Aluminum and Bronze Standard Machine and Cap Screws.
- ★ Sems and Sems-Phillips Head Screws.

**CAMCAR PRODUCTS CO.**  
606 18TH AVENUE, ROCKFORD, ILLINOIS  
Representatives in All Principal Cities

New  
water tight,  
air tight,  
dust tight  
gasketing  
procedures



..... WITH  
**Chrome Lock**

ADHESIVE BACK,  
CHROMATE IMPREGNATED  
FELT TAPES & STAMPINGS



## FOR ALL WATER, AIR AND DUST TIGHT JOINTS

Chrome Lock is a specially compounded and impregnated felt, containing zinc chromate as a corrosion inhibitor. Under low bolted or riveted pressures the resins traverse within the felt to form a positive dam.

On buses, for example, Chrome Lock tapes are widely used for sealing window sashes, skin laps and other faying surfaces. Chrome Lock offers advantages for your product, too!

**LESS APPLICATION MAN HOURS:** Chrome Lock's pressure sensitive adhesive back holds it in place, even on vertical or inverted surfaces. No tying, taping or cleanup. One-man operation. No odors. Non toxic.

**LOWER COSTS:** Actual cost comparisons of completed jobs, labor and materials considered, show savings up to 50% when Chrome Lock is used.

**LONGER GASKET LIFE:** Chrome Lock's continued pliability and distortion resistance assure a positive seal for the life of the installation.

**PREVENTS CORROSION:** Chrome Lock extrudes sufficient resins onto the faying surfaces and, being non-oxidizing, holds the metal in a passive state.

**ELECTROLYSIS PREVENTIVE:** Inhibits electrolytic action between dissimilar metal. Permits lighter flanging materials. Anti-wicking. Non-soluble in water or saline solutions. Permits the use of raw sheet stock for flanges. Protective cushion against vibration and shocks. Will not support combustion. (Type N, Navy Spec. 33F8.) Wide range of heat, cold and pressure resistances. Available in rolls, tapes or stamped;  $\frac{3}{16}$ " to 72" wide,  $\frac{1}{2}$ " to  $\frac{1}{4}$ " thick.

**FREE!** Write on your company letterhead, for engineering folder, No. CL-1021 and free sample, now!

\*\*\*\*\*  
**PRODUCTS  
RESEARCH COMPANY**

5426 San Fernando Road • Glendale, Calif.

# NATION-WIDE ASSEMBLY SERVICE

# HIGHLY CONTROLLED ACCURACY

# COMPLETE INTERCHANGEABILITY

... when you specify

## DANLY Precision Die Sets

Nation-wide die set assembly service, pioneered and perfected by Danly, is today a highly specialized business offering the stamping industry a fast, efficient means of obtaining deliveries on short notices. Because there are several Danly types and several thousand interchangeable combinations, a simple catalog selection is all that is usually required to suit specific needs.

The highly controlled accuracy of Danly Die Sets, with guide posts and bushings ground and lapped to close precision tolerances, assures top performance and long die life.

In addition, because designs and tolerances are standardized and maintained, you are assured of complete interchangeability. This is why so many plants have found it profitable to standardize on Danly Die Sets gaining flexibility of operation and worthwhile economy.

### Use Danly's Special Machining Service and Save Time . . .



For special die sets, include any additional machining on your special die set order. Die wells, inserts, keyways and other operations will be performed to your specification.

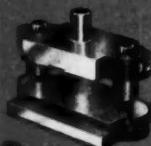
Write for *free* bulletin and complete details

# DANLY

### WIDE SELECTION OF STANDARD TYPES

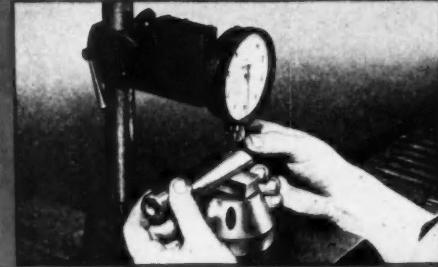


Regular Bush-Face Set



Standard Center-Face Set

Long Narrow Bush-Face Set



Accuracy is rigidly controlled. Modern precision gauging methods are employed.



Stock and replacement problems are simplified when you standardize on Danly Precision Die Sets.

### Call on the Danly Branch nearest you

These Danly branches are in position to give you efficient service. Assembly plants listed below (marked with stars) stock interchangeable parts for quick assembly and delivery of any standard die set to suit specifications.

- \* Chicago 50, 2100 S. 52nd Ave.
- \* Cleveland 14, 1550 E. 33rd St.
- \* Dayton 2, 990 E. Monument Ave.
- \* Detroit 16, 1549 Temple Ave.
- \* Grand Rapids, 113 Michigan St., N.W.
- \* Long Island City 1, 47-28 37th St.
- \* Los Angeles 54, Ducommun Metals & Supply Co., 4890 S. Alameda
- \* Milwaukee 2, 111 E. Wisconsin Ave.
- \* Philadelphia 44, 18 W. Chelten Ave.
- \* Rochester 4, 16 Commercial St.

### DANLY MACHINE SPECIALTIES, INC.

2100 SOUTH 52nd AVENUE • CHICAGO 50, ILLINOIS



25 YEARS OF DEPENDABLE SERVICE  
TO THE STAMPING INDUSTRY

One of a series of messages to help you increase your understanding of business paper advertising, and its effect on your business.

# Why you and your advertising manager are partners

**F**ROM WHERE YOU SIT, advertising may look like the "glamour department" of your company—necessary, of course, but pretty far removed from the hard-headed realities of the production line.

But take a closer look. In one respect, the advertising manager's job bears a striking resemblance to your own.

You're production-minded. You're concerned with anything that will improve plant procedures, speed up assembly time, prevent waste, and reduce the manufacturing cost per unit.

And that is precisely where you walk arm-in-arm with your advertising manager. Because he thinks the same way about the *manufacture of a sale*.

The whole process of selling and distribution are his assembly line. And every time he can reduce the unit cost of a sale by so much as a few cents, he increases your company's chance to show a profit.

Ask him for a definition of advertising, and he will probably tell you that it is simply *mechanized selling*, a machine that multiplies the productive capacity of the sales force — seeking out prospects, arousing their interest, creating a preference for the things your company makes.

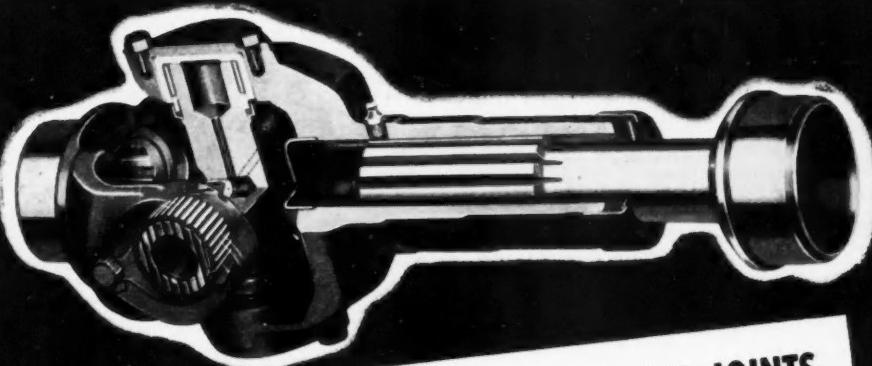
And when it is concentrated among the hand-picked readers of business papers, advertising becomes the most efficient machine this partner of yours has found for lowering the cost of producing a sale.

*What are the ten ways to measure the results of your business paper advertising? You'll find the answers in a recent ABP folder, which we'll be glad to send you on request. Also, if you'd like reprints of this advertisement (or the entire series) to show to others in your organization, you may have them for the asking.*



## AUTOMOTIVE INDUSTRIES

*is one of the 129 members of The Associated Business Papers, whose chief purpose is to maintain the highest standards of editorial helpfulness—for the benefit of reader and advertiser alike.*



**Spicer**

## NEEDLE BEARING UNIVERSAL JOINTS Offer Exclusive Features for Exceptional Services

**Design**—Rigid one piece forged steel yokes and journal cross carry full torque load and provide precision needle bearing alignment.

Simple—sturdy—reliable.



**Material**—Carefully heat-treated steel forgings to resist fatigue and shock loads. File-hard bearing surfaces to resist wear.



**Accuracy**—Precision fits and surface finishes assure vibrationless, trouble-free, dependable operation.



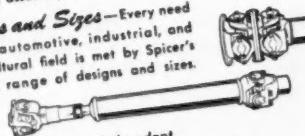
**Balance**—Spicer has unequalled facilities for maintaining very close limits of static and dynamic balance in all units.



**Lubrication**—After initial pressure lubrication, centrifugal action distributes reserve lubricant to bearing surfaces. Centrally located lubrication fittings allow refilling of lubricant reservoirs with shaft in installed position, without affecting original assembly or balance.



**Types and Sizes**—Every need in the automotive, industrial, and agricultural field is met by Spicer's broad range of designs and sizes.



Spicer engineers will help adapt  
Spicer Needle Bearing Joints to your particular needs.



**SPICER MANUFACTURING**

Division of Dana Corporation

TOLEDO 1, OHIO

45 YEARS OF

**Spicer**  
SERVICE

TRANSMISSIONS • PASSENGER CAR AXLES  
CLUTCHES • PARISH FRAMES • STAMPINGS  
TORQUE CONVERTERS • UNIVERSAL JOINTS  
SPICER "BROWN-LIFE" GEAR BOXES  
RAILWAY GENERATOR DRIVES

# EATON

## Zero-Lash

Registered U. S. Patent Office

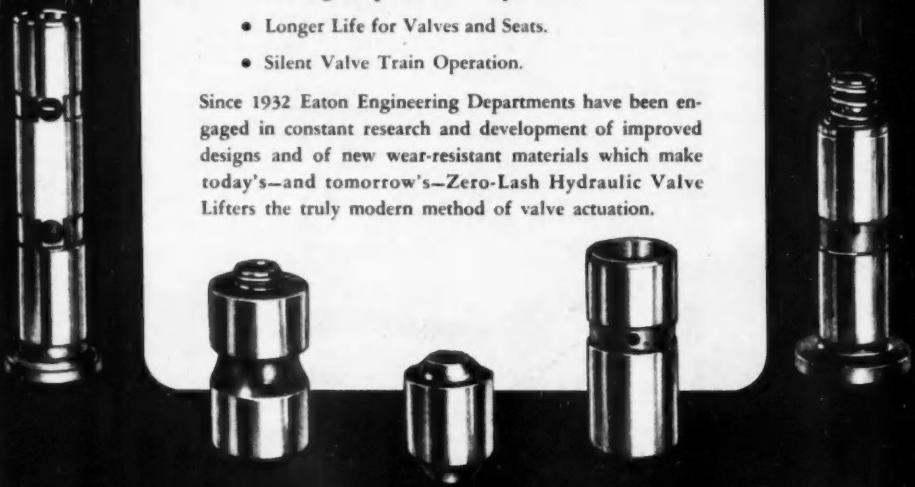
### HYDRAULIC VALVE LIFTERS

#### *The Modern Method of Valve Actuation*

Millions of Zero-Lash Hydraulic Valve Lifters and Zero-Lash adjusting units—designed and developed exclusively by Eaton Manufacturing Company—have gone into leading automotive, aircraft, tractor, marine and industrial engines in the last 17 years. They have contributed:

- Freedom from Tappet Adjustments for the Life of the Engine.
- Accurate Valve Timing and Perfect Seating at All Engine Speeds and Temperatures.
- Longer Life for Valves and Seats.
- Silent Valve Train Operation.

Since 1932 Eaton Engineering Departments have been engaged in constant research and development of improved designs and of new wear-resistant materials which make today's—and tomorrow's—Zero-Lash Hydraulic Valve Lifters the truly modern method of valve actuation.



EATON MANUFACTURING COMPANY

CLEVELAND, OHIO

Saginaw Division

9771 French Road • Detroit 13, Michigan



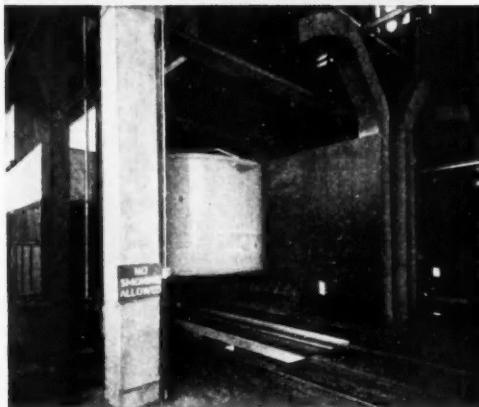
PRODUCTS: SODIUM COOLED, POPPET, AND FREE VALVES • TAPPETS • HYDRAULIC VALVE LIFTERS • VALVE SEAT INSERTS • ROTOR PUMPS • MOTOR TRUCK AXLES • PERMANENT MOLD GRAY IRON CASTINGS • HEATER-DEFROSTER UNITS • SNAP RINGS • SPRINGTITES SPRING WASHERS • COLD DRAWN STEEL • STAMPINGS • LEAF AND COIL SPRINGS • DYNAMATIC DRIVES, BRAKES, DYNAMOMETERS

# COMPLETE *Finishing* SYSTEMS

for ENAMEL • LACQUER • PAINT



Mahan Hydro-Filter Spray Booths in two finishing production lines. These booths, part of a Complete Finishing System installed at the Fruehauf Trailer Company's plant, Avon Lake, Ohio—are specially designed for painting Van Bodies of assembled Truck-Trailers.



More Mahon Hydro-Filter Spray Booths in the same installation—these spray booths are specially designed for applying finish coat to under-side of Van Bodies and Chassis.

## ... a Capital Investment in Cost-Lowering Operating Efficiency!

You don't buy a finishing system every day . . . the capital outlay for such equipment will be reflected in your finishing costs and the sales curve of your product over a period of years. Your first concern in selecting finishing equipment should be performance . . . the operating efficiency of equipment of this type, which must be planned, engineered and produced to do YOUR particular finishing job, will be in direct proportion to the ability and the experience of the engineers entrusted with the job. Initial cost, therefore, is of secondary importance . . . your primary consideration is operating efficiency and cost per unit processed in every day operation. You cannot afford to place the responsibility for equipment which so directly affects the saleability of your product in the hands of other than those best qualified. Mahan engineers have pioneered development in this highly specialized field for twenty-eight years . . . their experience, which is world-wide in scope and covers virtually every industry where finishing is a major production operation, has endowed them with a wealth of technical knowledge and practical know-how not available to you elsewhere. See Sweet's Mech. Ind. File for complete information.

### THE R. C. MAHON COMPANY

Home Office and plant, Detroit 11, Mich. • Western Sales Div., Chicago 4, Ill.

Engineers and Manufacturers of Complete Finishing Systems—including Metal Cleaning and Rust Proofing Equipment, Dry-off Ovens, Hydro-Filter Spray Booths, Filtered Air Supply Systems, Drying and Baking Ovens, and Paint Reclamation Units. Also, Core Ovens, Hydro-Foam Dust Collectors, and many other Units of Special Production Equipment.

# MAHON

**MEMO**

*How to help  
your President*

## **stop passing profits to the scrap dealer**

Maybe you have been running antiquated machines so long that your President has come to expect a high write-off for spoilage as a normal production cost. But the "book savings" from operating old, amortized automatic bar machines can be quickly eaten up by the excessive costs of production rejects.

Perhaps a simple reminder—a few case histories on the experiences of some of our customers—will demonstrate to your top executives how the new Acme-Gridley Automatics can "up" your production profit.

We would be glad to send you more of these actual performance records, if you like—or prepare a specific machine recommendation to fit your individual needs.

CUT THIS OUT FOR USE WHEN YOUR PRESIDENT WANTS PROOF

### **AN ACME-GRIDLEY CERTIFIED CASE STUDY**

#### **THIS IS WHAT HAPPENED:**

**MACHINE**—2" RB-6 Spindle Acme-Gridley Bar Automatic

**PART TURNED**—Sewing Machine Shuttle Blank

**MATERIAL**—SAE 1112 Bar Stock

**OPERATIONS**—20, including pick-off and shaving back radius

**TOTAL TIME PER PIECE**—23 Seconds

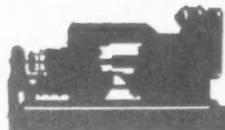
**TOLERANCE**—.002" between stem and inside wall

#### **AND HERE'S ONE IMPORTANT REASON:**

ACME-GRIDLEY SPINDLE CARRIER, designed with bearing surfaces two-thirds the length of headstock housing. A heavy bearing in the gear box section and the guide-arm, both supporting the stem end, provide a three-point bearing for the carrier system. This rigid support is a basic reason for sustained accuracy under heavy duty service. Carrier and stem are concentrically ground, by an exclusive National



Acme process, at one setting—to give basic positive alignment, for greater machining accuracy. The forged end tool slide is mounted around this hardened stem. Permanent alignment of the tools with the work is one of many important reasons for the precision, speed and long life of Acme-Gridley Automatics.



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AND CHUCKING AUTOMATICS**  
built in 4, 6 and 8 spindle styles, maintain accuracy at the highest spindle speeds and fastest feeds modern cutting tools can withstand.

**THE NATIONAL ACME COMPANY**

170 EAST 131<sup>st</sup> STREET • CLEVELAND 8, OHIO

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It sums up important advantages that make Bower bearings unique . . . truly outstanding in the tapered bearing field. It stands for such different and greatly improved design features as spherical roll-ends and flange surfaces, the large oil groove; plus the most advanced production techniques that make possible the smooth, hard, durable races that you find in Bower bearings. In short, Spher-O-honed really means smoother performance, greater dependability, and longer bearing life for your product.

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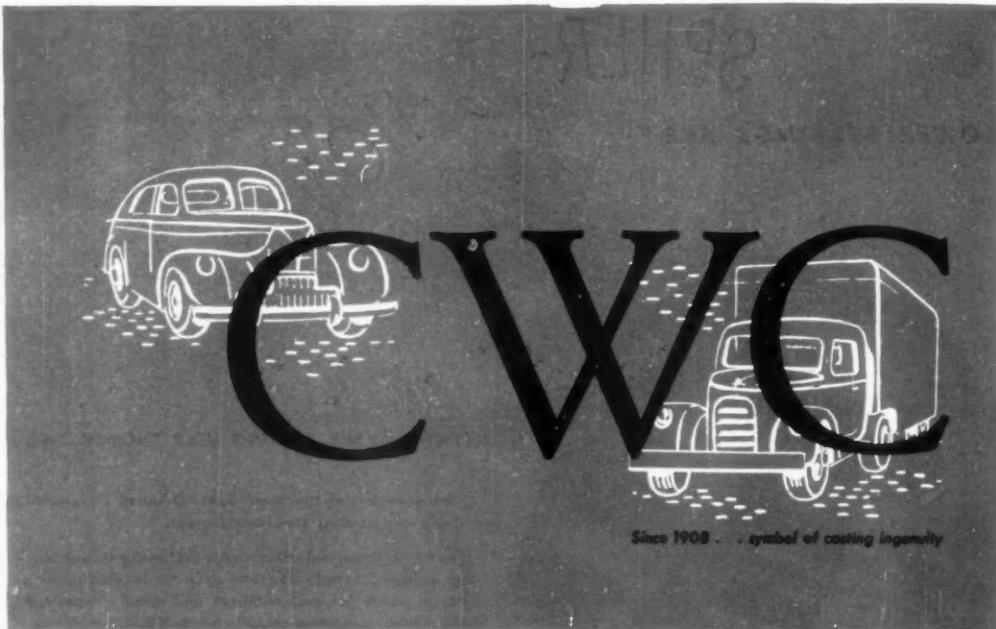
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Men in the automotive industry have long recognized CWC as the source of most that is new in casting iron and steel. Because of CWC advanced metallurgical engineering, precise control of the metal before it is poured, and mechanized facilities for volume production, great developments in castings have been made possible. From the five Campbell, Wyant and Cannon foundries come many thousands of *cast* cylinder blocks and heads, *cast* pistons, *cast* gears, *centrifugally cast* cylinder liners and revolutionary *cast* camshafts. These, and scores of other CWC castings are incorporated in leading automobiles, contributing to better design and operation, and to greater economy.

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CAMPBELL, WYANT AND CANNON FOUNDRY COMPANY

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Build in the quality your product needs to meet the challenge of competitive markets with "Standard" Welded Stainless Tubing. In many applications the ultimate cost of Stainless is less than tubing made from other materials. And you get smarter, more attractive styling—rugged durability—corrosion and heat resistance—in a tubing that can take it. "Standard" Stainless is easy to fabricate, resulting in more economical manufacturing techniques for you. Let Standard's 25 years of tubing experience assist you in developing methods for product improvement requiring the use of high quality Welded Stainless Steel Tubing.

## SIZE AND THICKNESS CHART for STAINLESS STEEL TUBING

TUBE DIAMETER	MAXIMUM WALL		MINIMUM WALL		
	"O.D. SIZE	DECIMAL	B. W. GAUGE	DECIMAL	B. W. GAUGE
3/8"	.035"	20	.025"	.23	
1/2"	.035"	20	.025"	.23	
5/8"	.049"	18	.028"	.22	
3/4"	.049"	18	.028"	.22	
7/8"	.065"	16	.028"	.22	
1"	.083"	14	.028"	.22	
1-1/8"	.083"	14	.028"	.22	
1-1/4"	.083"	14	.028"	.22	
1-3/8"	.083"	14	.028"	.22	
1-1/2"	.095"	13	.035"	.20	
1-5/8"	.095"	13	.035"	.20	
1-3/4"	.095"	13	.035"	.20	
1-7/8"	.095"	13	.035"	.20	
2"	.095"	13	.035"	.20	
2-1/4"	.095"	13	.035"	.20	
2-1/2"	.095"	13	.035"	.20	
2-3/4"	.095"	13	.035"	.20	
3"	.095"	13	.035"	.20	

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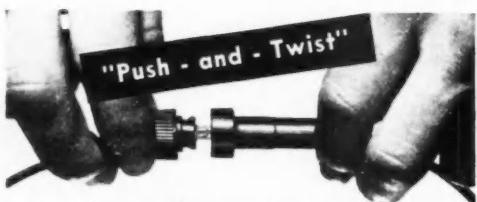
Milwaukee 10, Wisconsin

FAMOUS IN



LEATHER

Our 25<sup>th</sup> Year



## Littelfuse Makes Headline News with "In-Line" Fuse Retainer

Littelfuse's latest development: the "in-line" fuse retainer for fingertip ease in fusing. Precisely molded of high impact bakelite and designed primarily for low voltage applications: car radios, heaters, spot lights and other automotive trouble spots where a fool-proof easy-to-handle fuse installation is desired. The strongly spring-locked retainer opens with a "push-and-twist" of the finger tips. Inside, the fuse rests against knife-edged, cup contacts that assure greatest degree of contact with lowest voltage drop. Doubled wall thickness at juncture of shoulder and lower body.



The Littelfuse "in-line" retainer is available in a variety of sizes and shapes to fit your own specifications. Larger opening at either end uses up to #12 standard automotive wires. Available for all standard automotive fuse sizes. Retainer may be had with or without leads and terminals, with or without fuses.



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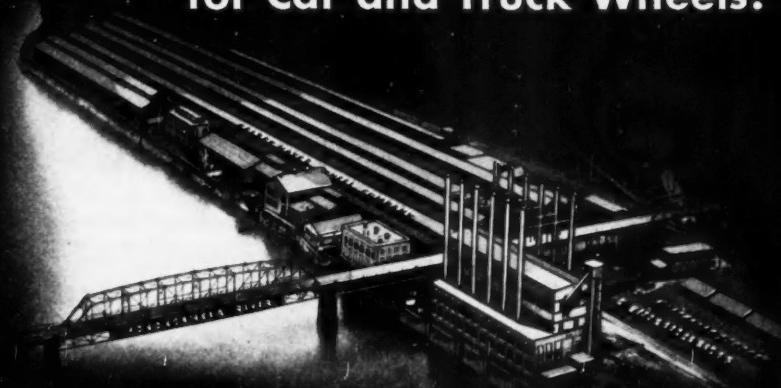
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## SPECIFY



Reg. U. S. Pat. Off.

Knurling of Socket Screws originated with "Unbrako" in 1934.

### KNURLED SOCKET HEAD CAP SCREWS

... and, you save time, facilitate compact designs, reduce weight and costs.

**KNURLING**—an exclusive "UNBRAKO" feature—speeds assembly by providing a "sure grip" even for oily fingers . . . INTERNAL WRENCHING promotes compact designs, saves space, weight, materials and costs. "UNBRAKO" Knurled Socket Head Cap Screws are available in sizes from #4 to 1½" in diameter in a full range of lengths.



Kits: pat. pend.

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You can't tighten or loosen socket screws without a hex socket wrench, so why not get our No. 25 and No. 50 "HALLOWELL" Hollow Handle Key Kit which contains almost all hex socket bits.

Write for the name and address of your nearest "UNBRAKO" Industrial Distributor and your copy of the "UNBRAKO" Catalog.

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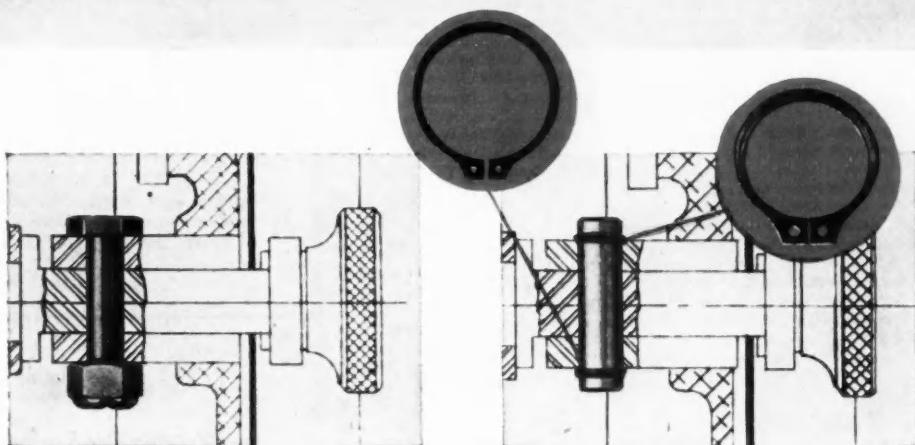
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# Truarc saves 5 minutes, 9 cents in materials per unit without re-design of electric sanders



OLD WAY

Special 1/4" cap screw and 1/4-28 fibre-insert nut holds idler arm and pulley assembly on Model A3 "Take-Apart" Sander, Porter-Cable Machine Company.

NEW WAY

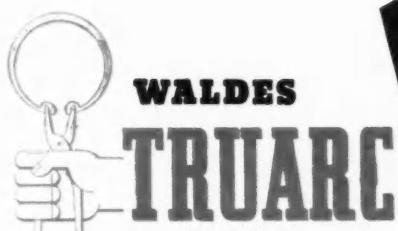
Simple 1/4" C.R. shaft, grooved in automatic screw machine, equipped with Waldes Truarc Retaining Rings. Bowed external ring (#5101-25) at top exerts resilient pressure taken up by Standard external ring (#5100-25) at bottom. Assembly is secure against vibration, can be easily taken apart and re-installed many times with same Truarc rings.

Every sander through the production lines costs 9 cents less for materials, requires 5 minutes less labor—with just the simple change from cap screw and nut to Waldes Truarc rings by Porter-Cable Machine Company, Syracuse, New York. The change to Truarc required no new design, no alterations in castings, but just the reappraisal of old methods.

Truarc can help you cut costs and increase produc-

tion, too. Wherever you use machined shoulders, nuts, bolts, snap rings, cotter pins—there's a Truarc ring that does a better job of holding parts together. All Waldes Truarc Retaining Rings are precision engineered, remain always circular to give a never-failing grip.

Send us your drawings. Waldes Truarc engineers will be glad to show how Truarc can help you.



REG. U. S. PAT. OFF.

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WALDES TRUARC RETAINING RINGS ARE PROTECTED BY U. S. PATS: 2,102,948; 2,026,454; 2,416,852 AND OTHER PATS. PEND.



Waldes Kohinoor, Inc., 47-10 Austel Place  
Long Island City 1, N. Y. AY-5

Please send 28-page Data Book on Waldes Truarc Retaining Rings.

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Company \_\_\_\_\_

Business Address \_\_\_\_\_

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UNDER development for several years, the new WICO XHD magneto will give your engine the spark it needs for hard continuous service, regardless of dust or dampness.

The rugged heavy duty CONDENSER stands up under the most adverse conditions. The large 3/16" tungsten CONTACTS resist fouling and missing. The molded, insulated COIL — in its tough plastic case — is far stronger than tape winding so there's less chance of breakdown. The Alnico-6 magnetic ROTOR UNIT means dependability in the heart of the magneto.

If you've had magneto trouble, the new economical XHD will change that. Trained field engineers and more than 2,000 authorized service stations serve WICO users everywhere. Wico Electric Company, West Springfield, Mass.

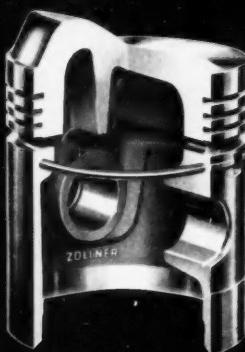
The XHD magneto weighs 6 lbs., is 6" long, 6" high and 3-3/16" wide. Spark output at engine starting speeds, 18kv. At 1500 RPM, output is 26kv.

A special bronze bushing and ball bearing insure trouble-free service. Built-in impulse coupling. On flange-mounted models, a Buna-N oil seal prevents leakage.

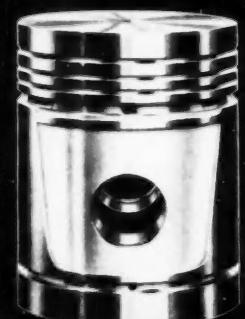




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Manual installation if desired—no special tools required to install or remove. Re-usable—especially valuable when machines are serviced in the field. Easily adapted to assembly line production with simple jigs.

Secure positioning, permanent positioning, exact positioning, of moving parts.

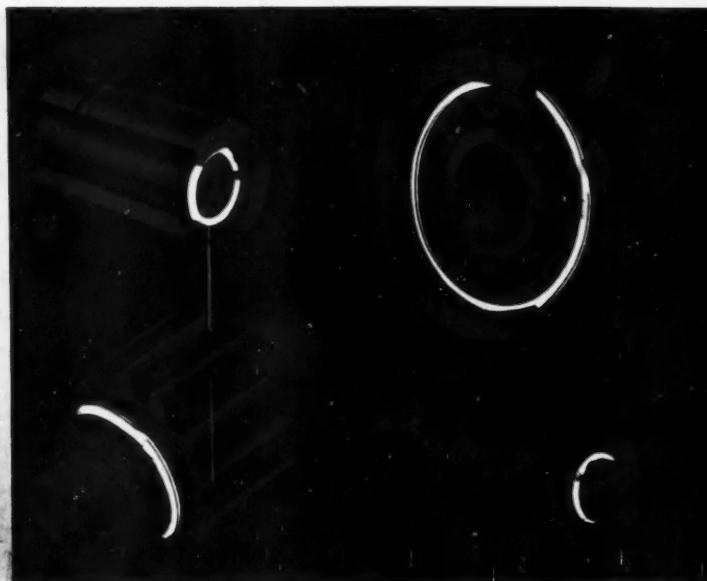
Reduced assembly time, reduction of parts, reduction of machining.

Simpler, lighter, more compact product design.

Dynamic balance. Full circularity; bearing surface all "round".

Eye appeal. Spirolox provides a uniform shoulder protrusion, without any irregularities.

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the better way to hold Moving Parts together...

When you spiral-in a Spirolox Retaining Ring, one more part is positioned precisely and locked securely. Due to its two-turn coil construction, Spirolox locks in the groove under thrust, will carry loads up to its full shear strength—will not jump out or squeeze out. Due to the lighter weight of Spirolox, centrifugal force does not tend to affect its locking characteristic.

Yet if the part is to be removed in shop or field, a flip of an ordinary screw driver frees it, and the ring is good for re-use over and over.

Study the typical Spirolox applications shown above. Read the Spirolox betterments. Then review your own product in those terms. Or send a print of it to our Spirolox Application Engineer for analysis. Spirolox applies where parts move. Probably it applies to your product—bringing you betterments in manufacturing, welcome savings in machining, assembly time, parts, space, weight!



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RB-2965